MARCH 22, 1958
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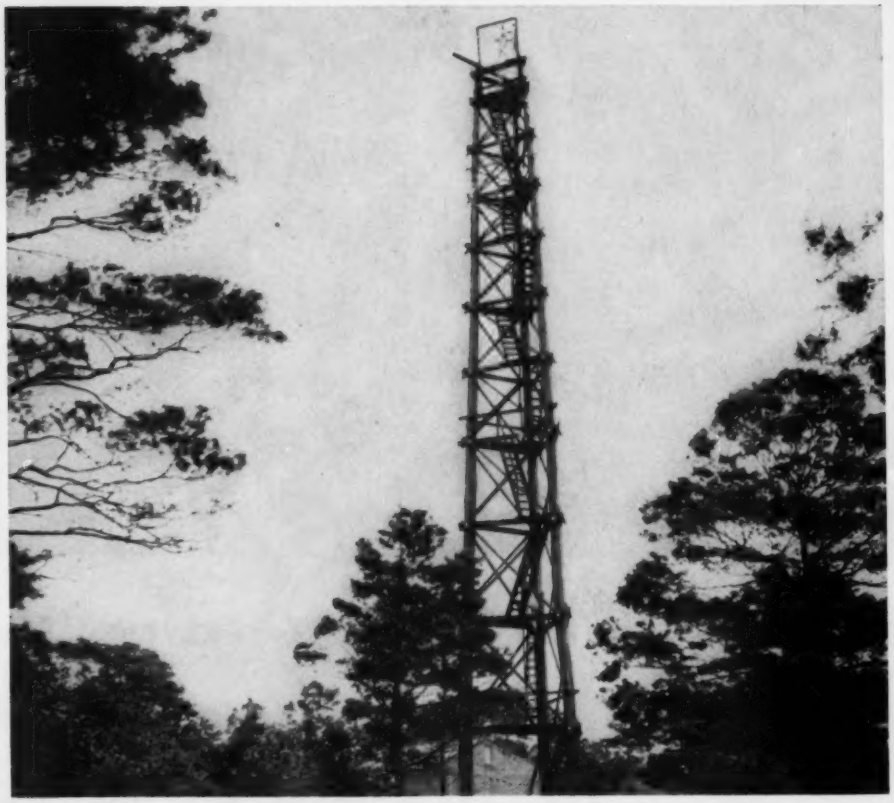
Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY



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VAC Guaranteed Circulation This Issue 12,306 of Which 11,729 Is Paid

MICROWAVE ADVENTURE

Crew of Gulf Telephone Co. of Foley, Ala., takes on difficult task of erecting 100-foot microwave tower out of treated poles. Here John Snook, general manager, and Birnie Taylor oversee hoisting of antenna disk from top of tower. See p. 30 for further details.

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SHAGGY BEAR STORY. "There was this old grizzly bear down in the canyon behind a tree," said the old telephone lineman who'd put in rural lines when the West was young. "The only way I could hit him was to ricochet a bullet off this high canyon wall.

"Well, I gauged my windage, calculated the lead of the barrel and the twist rate, the hardness of the bullet and the angle of yaw it would have after being flattened out against the canyon wall, and I'd judged my chances would be 60-40 I'd get the bear."

"Did you hit him?" broke in one of his anxious listeners.

"Nope," replied the old man. "I missed the wall."

•

SNOW JOB. Two telephone men who had worked at different locations on the DEW line were conversing:

"It was so cold where we were," said the first, "that the flame on a candle froze, and we couldn't blow it out."

"That's nothing," jibed the second, "where we were the words came out of our mouths in pieces of ice, and we had to fry them to see what we had said."

•

MOONKEY BUSINESS. A man telephoned an airline ticket office and asked for a seat on the next flight to the moon.

"I'm sorry, sir," said the passenger agent. "All flights to the moon have been canceled for a few days. The moon is full right now."

•

PLAIN GEOMETRY. Harold Coffin writing in the *Saturday Evening Post* says that the shortest distance between two teenagers is a telephone line.

•

HORSE OF A DIFFERENT COLOR. The hushed tones of a terrified woman greeted dispatcher Phyllis Wagner when she answered the San Mateo (Cal.) County sheriff's telephone recently.

"Something terrible is going on out here," the shaky voice whispered. "There are two men talking, right outside my house, out here on Edgewood Road."

The unidentified, nervous voice described the conversation:

"I have a cord around his neck now . . . here's a rope, that would be better. I don't know how we're going to get him down to the street. We'll just have to drag him . . ."

The dispatcher interrupted the recital.

"Oh, don't worry," she said cheerfully, and then told the caller that deputies Wilmar Kruger and Harold Francis had been called out to round up a stray jackass.

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Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY
Since 1901

March 22, 1958

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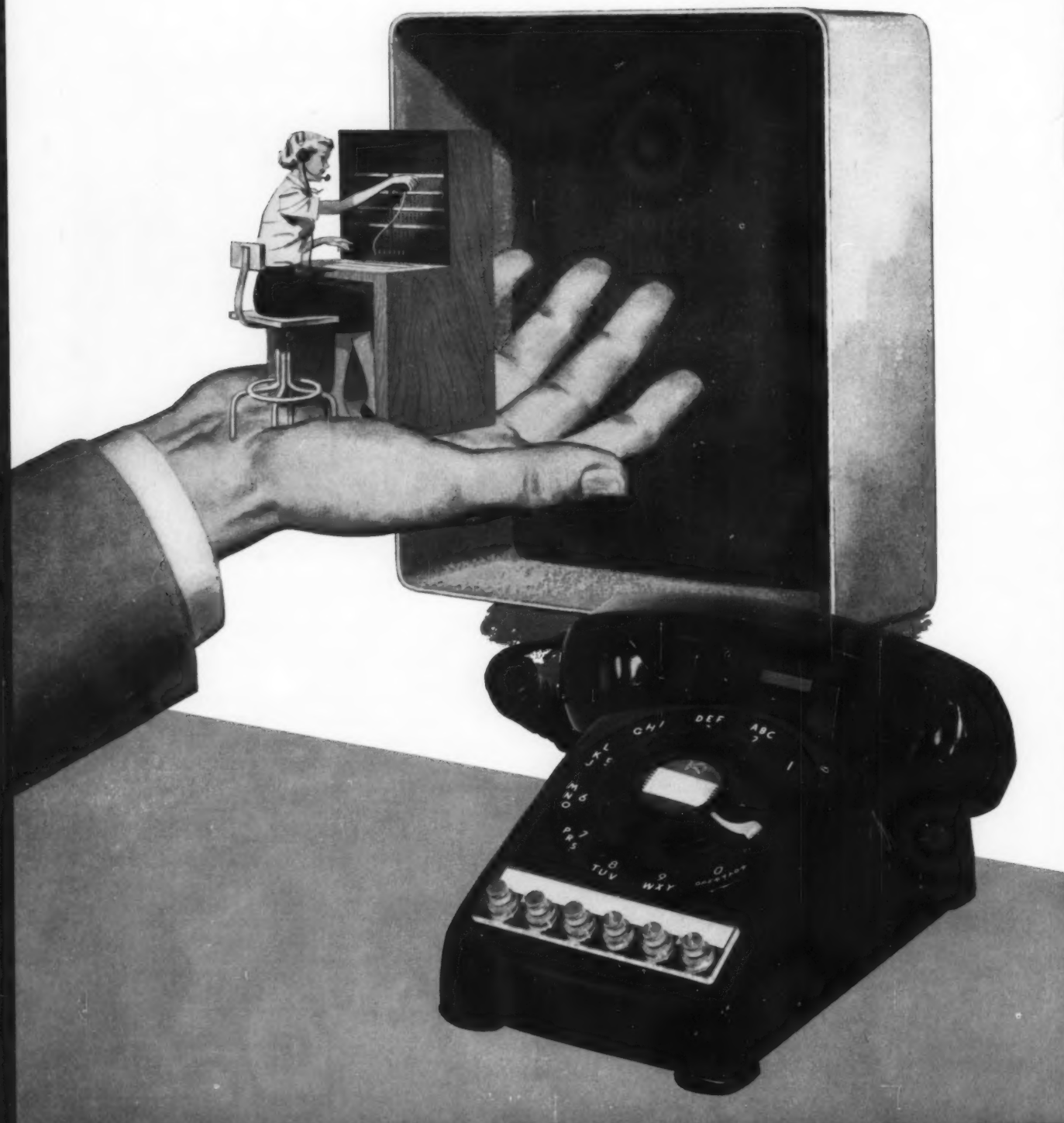
If we put a midget operator



in the control box –

If you put a midget operator in the control box of your key system you might be able to match the service you get from your K1A1 system. But you would have a busy midget. Here are a few of the things she would have to do, and do efficiently and tirelessly.

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She would have to give intercommunication service. The K1A1 permits you to select any one of eight other key phones simply by dialing one digit.

She would have to hold calls. With the K1A1 you can hold one call while talking on another line. This permits every key telephone user complete operational control.

She would have to flash the illuminated buttons. With the K1A1, buttons flash on incoming calls and burn steadily when the handset is lifted . . . this prevents accidental interference by other users.

These are the features your subscribers get with the compact and easily operated K1A1 system. No wonder the 1A1 type system is the fastest selling key system in the country. You will find that the K1A1 is a truly profitable revenue producer. It is easy to install and it requires practically no maintenance.

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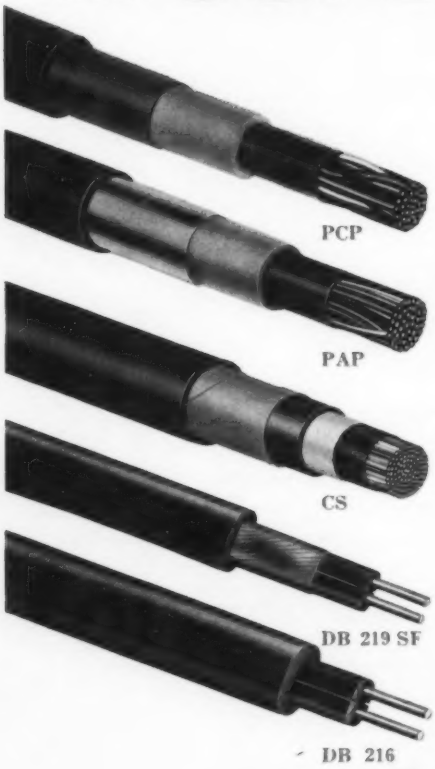

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ATTRACT CUSTOMERS...

EARN MORE

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Colored paystations are popular with merchants. Reason? They help dress up store surroundings! And, there are 10 rich colors to blend or contrast with any background: Jade Green, Forget-me-not Blue, Camellia Pink, Gardenia White, Garnet Red, Turquoise, Sunlight Yellow, Dawn Gray, Classic Ivory and Sand Beige.

Automatic's "80" Series paystations also offer many other features, including:

- New, reinforced burglar-proof housing
- Lighter, easier-to-hold handset
- True-to-life transmission
- Easier, surer dialing; large figures
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- Extended number plate

Paystations in the right locations earn a lot of revenue—and when they're colored, they earn even more! For complete information, write: *Automatic Electric Sales Corporation, Northlake, Illinois. Or call Fillmore 5-7111.*

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One of America's great communications systems

GENERAL TELEPHONE SYSTEM

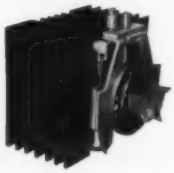
Telephone service that laughs at any weather!

NEW PHILCO CLR-9 MICROWAVE STATION

The CLR-9 terminal consists of wave-guide assemblies, master control, tubeless power supplies and plug-in chassis for IF assembly, baseband drop, modulator, reflector control and servo.

Rugged printed wiring panels increase circuit stability and simplify maintenance.

Heavy-duty, tubeless power supplies increase reliability by employing semiconductor rectifiers —assures maximum reliability and minimum maintenance.



Heat sinks cool the Klystrons by convection—gear drive assembly permits precise Klystron tuning.

Philco CLR-9 Microwave delivers 240 voice channel capacity on a single wide band path!

New Philco CLR-9 Microwave "building block" systems provide for easy expansion of toll circuits on major and subsidiary routes. Here is system economy of installation, operation and maintenance far surpassing other methods of transmission. CLR-9 microwave is engineered for absolutely reliable, unattended station operation . . . not susceptible to extremes of weather.

Plus Philco's Turnkey Services—
which include . . . *site surveys* by competent survey engineers experienced in field techniques; *system planning* by Philco's systems engineers who design your complete communications system; *installation* of your microwave system by Philco field engineers—including erection of towers and shelters; and, Philco field engineers are available for *field service*—periodic inspection and preventive maintenance—to maintain the highest standards of system performance.

Philco's new CLR-9 microwave equipment provides high channel density, duplex communications with integrated standby facilities for maximum system reliability. It is designed for quick installation in standard relay racks . . . and engineered with built-in metering and test facilities plus plug-in chassis for easy field maintenance.

Performance reliability is sharply increased in the new CLR-9 by the use of tubeless power supplies—new semiconductor rectifiers replace tubes. The use of printed wiring panels increases circuit stability—and complete plug-in chassis may be quickly removed by maintenance personnel (permits efficient, centralized depot maintenance). Klystrons in the new CLR-9 are cooled by convection . . . the use of compact heat sinks eliminates the need for bulky blowers.

To meet the challenge of advancing technology, we must support the rapid expansion of scientific education . . . at Philco, opportunities are unlimited in electronics and mechanical research and engineering.

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5. South Bay Motel
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6. Delmar Manufacturing Co.
   Cookeville, Tennessee
7. Parsons College
   Fairfield, Iowa
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   San Angelo, Texas
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3. Local links are not tied up on city trunk calls.
4. Standard Leich Telephones are used.
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6. Restriction of outside calls if desired.
7. Universal or predetermined night answer.
8. Code call service (optional).

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When businesses sell themselves on one PABX rather than another, there must be a reason. That's been the case with Leich's 40A PABX. Telephone companies have sold it to PABX prospects from Hawaii to Florida by simply telling them about it.

Perhaps the biggest reason why is Leich's exclusive keyset turret. Its compact size (it's smaller than a typewriter), and neat lines suggest a unit designed with the future in mind. What's more, the turret gives years-ahead performance, too. It lets the attendant extend incoming city trunk calls faster than ever before.

For more reasons why businesses choose Leich's 40A PABX, write for our catalog.

The

LEICH 40A PABX

with the exclusive Keyset Turret

LEICH

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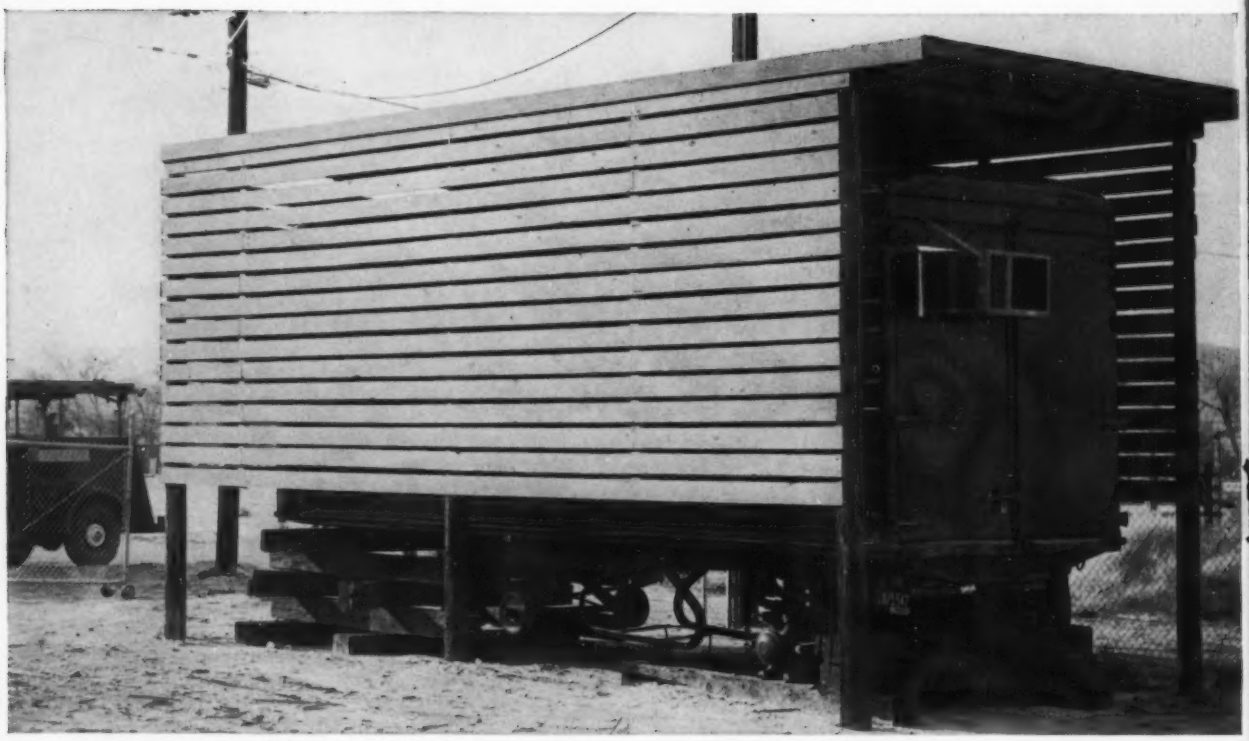
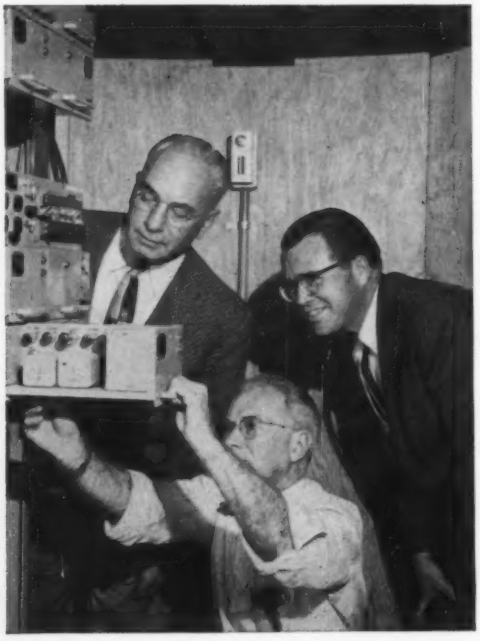


Lucerne Valley trailer in which 5 complete channels of Lynch B-120 subscriber line carrier equipment were installed.

First subscriber carrier installed in a trailer



helps meet 90-day cut-in deadline with 5 new circuits for California Interstate Telephone Company

When the Kaiser Permanente Cement Company planned their new $15,000,000 plant at Lucerne Valley, California, they asked Interstate for 5 circuits—*within 90 days.*

Since the nearest existing plant was twelve miles from the site, the situation called for some original thinking. Willard Wade, California Interstate's president, found a newspaper ad listing used trailers for sale. Immediately R. F. Nale, purchasing agent and J. F. Wegforth, central office engineer for Interstate, checked the trailers. They found one suitable to house subscriber carrier equipment, and Wally Kenney, Graybar Telephone Specialist, was called in.

W. C. Robinson (left), district plant superintendent, J. F. Wegforth (center), central office engineer, and Wally Kenney (right), inspect rural carrier equipment installed in the trailer.

In a matter of days, Graybar delivered 5 complete channels of Lynch B-120 subscriber line carrier equipment. This was installed and the trailer was hauled to its present location, Lucerne Valley. With the teamwork of everyone at Interstate, from the president down, plus fast staff work by Graybar, the unit was cut into service —on time.

Speaking of Graybar, Mr. Wade says: "The trailer-housed subscriber carrier is one of several 'firsts' established by the California Interstate Telephone Company. These would not be possible, however, without the excellent cooperation we have received from our suppliers, such as Graybar.

"We have enjoyed our relationship with Graybar for years. We have found that whether our problems are normal, routine ones, or completely unpredictable emergencies, Graybar people will always cooperate with us to the utmost."

Graybar is proud of its service to Interstate and other independent telephone companies in every State in the Union. For decades, we have supplied equipment to meet the specialized needs of independent telephone companies. Today, there are more than 130 Graybar offices and warehouses. In addition to pole line supplies, central office equipment, linemen's tools and safety equipment, more than 100,000 items of "everything electrical" help to make Graybar the working stockroom for many fast growing independent telephone companies.

Graybar Telephone Specialists and personnel are eager to work with you. Graybar, too, is an independent company, solely owned by its operating and retired personnel. You get *personal* service from people who have a *personal* interest in giving you the assistance you need.

747

Willard Wade has been president of California Interstate Telephone Company for the past three years. Prior to that he was general manager. Mr. Wade has been in the utility business since he graduated from the University of Colorado in 1930. He is past president of the California Independent Telephone Association, has served as Mayor of the Town of Bishop.

Bob Nale (left), purchasing agent for California Interstate Telephone Company, listens to a suggestion made by Wally Kenney, Graybar Telephone Specialist, on an equipment purchase order.

Call Graybar first for...

Graybar Quality Everything Electrical

GRAYBAR ELECTRIC COMPANY, INC.
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IN OVER 130 PRINCIPAL CITIES

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Red Hook Telephone Co.

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and many others!

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IN THE NATION'S CAPITAL

BY FRANCIS X. WELCH, WASHINGTON EDITOR

Louisiana Press Association condemns state regulatory commission's seeking to curtail paid advertising of Southern Bell in "taking its rate case to the public." Cross succeeds Mack in FCC. Rummens named REA assistant administrator in charge of rural telephone loan program.

FOR TELEPHONE people the Louisiana Press Association came into the news early this month when they passed a resolution condemning the efforts of regulatory commissions, or others, seeking to curtail the free use of paid advertisements by regulated public utility companies. This development has been a long time in coming. Indeed, this observer is surprised that it has not occurred long before now, to the newspaper, radio, and television fraternity, that the current persecution of public utilities (because they are putting some things in their advertisements which other people do not like), may mean dollars out of the pockets of the newspapers and the radio and television stations. Until very recently a good many newspapers seemed to be taking a rather complacent view of the attempts being made by politicians and others to gag public utilities, even to the point of preventing them from using advertising copy in their own self-defense. (See "Freedom of Speech for Public Utilities," by Welch, TELEPHONY, Oct. 19, 1957.)

This movement to gag or censure the utilities' advertising copy has taken three forms:

(1) Rulings by regulatory commissions that "self-serving" advertising by utilities is not properly chargeable as operating expenses.

(2) A recent ruling by the Internal Revenue Commissioner that expenditures by electric utilities complaining about public ownership was, in effect, political propaganda and not a business expense deductible for tax purposes.

(3) A proposal, which may be considered by one regulatory commission, that utility companies should actually be ordered to "cease and desist" from placing advertising defending their company's policies and positions in rate cases. Violations of such orders could lead to contempt proceedings, resulting even in fines, penalties, or prison for defiant company officials.

The first of these procedures is perhaps the least objectionable because there has been some question concerning various types of advertising by utility companies as to whether it should be charged against the ratepayers (operating expenses) or charged against the surplus account (which would mean that the stockholders would have to pick up the tab for the advertising). There are clear-cut situations, already mentioned in this department, for the proper application of both of these methods of charging off utility advertising expense.

There are, of course, some people who take the rather narrow position that everything a public utility company does results in an expense either to the ratepayers or the company's owners. Therefore, they believe that management should not do anything at all, except whatever is absolutely necessary in the operation of the company. Such a view is occasionally taken by those who say that a public utility should not advertise at all.

But that reaction is not realistic. There are some forms of advertising designed to give the customer information about the service. Clearly, advertising designed to acquaint the public with such service information is not only permissible, but necessary. On the other hand, there are those forms of publicity clearly not chargeable against the utility ratepayers. A public utility company announcing the offering of a new security issue, or a "call" on some outstanding bonds for redemption, would obviously be serving only the interest of the company's owners. As such, the cost is nearly always charged to the company's capital, as an expense to be borne by the owners of the company after the return allowance from rate revenues.

In between these two clear-cut contrary examples we have various types of public utility advertising which are not so clearly defined. In the electric utility business, for example, there has been a steady invasion, over the past 20-odd years, of government ownership. Today one-fifth of that industry is engulfed. It is one of the striking paradoxes of our times that advertising by electric utilities in defense of their industry's right to continue in the realm of private enterprise is attacked as "political."

When a hard-pressed railroad industry pays for national advertisements and publicity to point out unfair features of its competition, is that a business expense? When any other kind of business seeks to fight competition in the only available avenue open—the space ad—is that a business expense? Generally it is agreed that it is, except for public utility companies seeking to expose allegedly unfair treatment from government or other sources. Recently the Internal Revenue Commissioner handed down a ruling that such expenditures were not deductible for tax purposes.

The paradox lies in the fact that often those who make this charge are politicians who have liberal access to far more media of publicity in the political field and in the field of government operations and publications than utility companies. Critics of the utility industries may employ congressional hearings, postal privileges and even government printing presses for the very purpose of denying the right of a

utility company, on a limited cash-and-carry advertising basis, to obtain paid publicity.

Perhaps the real reason for the criticism of utility advertising by the industry's political critics is that such advertising is so effective. It is really getting through to the public with a great institutional story. If utility advertising were not getting through, there would be no threat by its critics to stifle it, because there would then be no point in objecting to an ineffective thing.

The Louisiana Resolution

The Louisiana Press Association action came as a result of increasing concern on the part of the Louisiana press over recent efforts in political and regulatory circles to curtail paid advertisements by public utility companies in defense of their own policies in rate cases or on other matters.

This matter came to a head in Louisiana where differences have broken out between the Louisiana Public Service Commission and the Southern Bell Telephone & Telegraph Co. because the commission reduced telephone rates instead of increasing them, as requested. The telephone company, having exhausted its appellate remedies, felt that it had no other alternative except to take its case to the public through paid advertising.

Generally, these ads purport to show that prevailing rates do not provide a sufficient return to warrant continued expansion of plant construction necessary for adequate service. According to a press story in the New Orleans *Times-Picayune*, of Feb. 28, the chairman of the commission said that if the telephone company persisted in its advertising campaign he was going to ask the commission to order the company to curtail activities along this line. The chairman said that he did not regard them as proper operating expenses.

The Louisiana Press Association, meeting in New Orleans on Mar. 1, condemned the commission's attitude in a vigorous resolution. It pointed to the "growing tendency on the part of government officials and regulatory bodies to deny to the public its basic right of full information." It specifically referred to the "invasion of the right to free speech and free press" manifested by the Louisiana commission, through its chairman "in warning the Southern Bell Telephone company to curtail its advertising program." The press association, accordingly, resolved that "all regulatory bodies (should) desist and refrain from any rulings which will curb or restrict the right of any business under its jurisidiction from use of the medium of advertising to inform the public on matters of public interest."

The resolution also "vigorously protested" the rulings by the Internal Revenue Service against writing off institutional advertising as a business expense. Roland T. Hudson, publisher of the Zachary (La.) *The Plainsman*, told the association that newspapers could very easily lose institutional advertising "unless we do something about it." "Within the past two weeks," he said, "the internal revenue bureaucrats have made Senator Kefauver (D., Tenn.) very happy by ruling that the bureau will disallow as a business expense all institutional advertising which might be considered to influence public opinion on the matter of any legislation."

Hudson went on to point out that the Internal Revenue Service has not the power to say that utility companies cannot run such advertising. He said, "The bureaucrats have dreamed up the neat trick of saying that the stockholders—not the ratepayers, or customers—must bear the cost of such advertising."

Hudson concluded by suggesting that a permanent committee be established to work with the Newspaper Association Managers, the Advertising Council, and other associations in an effort "to get across the story to the public and to our lawmakers of just what advertising is and what it accomplishes for buyer and seller alike."

Censuring Advertising

The most controversial type of attempted interference with public utility advertising, of course, would be any effort by a regulatory body to order a company to discontinue such advertisements regardless of who paid for them. It is very doubtful if a commission would have legal authority to take any action. Few commissions claim to have any powers to punish for contempt, and so far none have ever tried to exercise such authority directly by their own order. There have been instances in the past where commissions have applied to the *courts* for contempt orders in order to discipline recalcitrant or perjurious witnesses.

But, the chairman of the Louisiana commission was quoted in the press as saying to the Southern Bell company (concerning its press, radio, and television advertising dealing with its rate cases) that "if you persist . . . my intentions are to seek the commission to direct you to curtail your activities

(Please turn to page 46)

1958 Convention Calendar

Association	*Date*	*City*	*Hotel*
Iowa	April 8 and 9	Des Moines	Fort Des Moines
Ohio	April 14, 15 and 16	Columbus	Deshler-Hilton
North Dakota	April 14 and 15	Fargo	Gardner
Nebraska	April 22 and 23	Omaha	Paxton
Indiana	May 7 and 8	Indianapolis	Claypool
American Railroads (Communications Section)	May 13, 14 and 15	Kansas City, Mo.	Muehlebach
Wisconsin	May 14 and 15	Milwaukee	Plankinton House
Illinois	May 21 and 22	Peoria	Pere Marquette
Kansas-Missouri*	May 26 and 27	Kansas City	Town House
Pennsylvania	May 26, 27 and 28	Bedford	Bedford Springs
Maine-New Hampshire-Vermont*	June 3, 4 and 5	Rockland, Maine	Samoset
California	June 4, 5 and 6	San Francisco	Sheraton-Palace
New York	June 16, 17 and 18	Schroon Lake	Scaroon Manor
Oregon-Washington*	June 19, 20 and 21	Portland, Ore.	Multnomah
Alaska	Aug. 11, 12, 13	Juneau	Baranof
Michigan	Sept. 9, 10 and 11	Grand Rapids	Pantlind
Arkansas	Sept. 15 and 16	Hot Springs	(Unannounced)
Rocky Mountain	Sept. 17, 18 and 19	Salt Lake City	Utah
West Virginia	Sept. 24 and 25	Davis	Blackwater Lodge
North Carolina	Oct. 6 and 7	Pinehurst	Carolina
USITA Annual convention	Oct. 13, 14 and 15	Chicago	Conrad Hilton
Virginia	Oct. 30 and 31	Roanoke	Roanoke
Oklahoma	Nov. 5 and 6	Oklahoma City	Huckins
Alabama-Mississippi*	Nov. 10 and 11	Unannounced	Unannounced

*Joint Convention

Economic Selection Studies

By JOHN D. DRESSER

Part 3

3. 000 *FACTOR TABLES.* 3.100 *General.* On the pages following these paragraphs, there are tables of factors. The factors in each table are made up on the basis of $1.00, and are presented for periods of time to and including 50 years, compounded annually at various costs of money rates. To obtain the desired answer, multiply the proper factor by the number of dollars to be affected by the factor.

3.200 Compound Interest Factors (Table 7).

3.210 Money loaned or used to produce interest (See paragraph 2.322) is called "principal." The sum of principal plus interest is known as the "amount." Thus, if $1.00 is loaned for one year at 6 per cent, the interest is $1.00 x .06 = $.06. Then, the amount is $1.00 + $.06 = $1.06. For the second year, the compound interest is [$1.00 + ($1.00 x .06)] x .06 or ($1.00 + $.06) x .06 = $1.06 x .06 =$.0636.

The amount at the end of the second year is the principal of $1.00 plus the first year's interest plus the second year's interest, or $1.00 + $.06 + $.0636 = $1.1236. There is not a "new" dollar involved every year, but only one original dollar. As all the factors in *Table 7* are based on a principal of $1.00, this two-year amount of $1.1236 appears in the table as the factor for two years at 6 per cent.

If the amount for any other number of dollars for two years at 6 per cent is desired, suppose for $338.97, this factor 1.1236 is multiplied by $338.97, giving $380.87. Finding the amount (principal + compound interest) of a sum of money over a period of years, is finding the future value, or "future worth," of a sum of money put out at interest *now* (the present worth). That is, it is converting a present worth into a future worth. Another way of considering it is that it shows how a present worth will look in "n" years from now.

3.220 By an inspection of the above and other similar examples which may be developed, it can be seen that the formula for the compound interest table is

$$A_n = (1 + i)^n$$ where

n is the number of years.

i is the cost of money expressed as a decimal.

A is the amount for the n year period.

If only the cost of money is desired, subtract 1 (principal of $1.00) from the factor before multiplying.

Compound Interest Factors

(To Convert Present Worth to Future Worth)

$(r)^n$ = Amount at compound interest of $1.00 (in hand at beginning of first year) at end of any year, n.

Year, n	i = 2%	i = 3%	i = 4%	i = 5%	i = 6%	i = 7%	i = 8%
1	1.02	1.03	1.04	1.05	1.06	1.07	1.08
2	1.0404	1.0609	1.0816	1.1025	1.1236	1.1449	1.1664
3	1.061208	1.092727	1.124864	1.157625	1.191016	1.225043	1.259712
4	1.082432	1.125509	1.169859	1.215506	1.262477	1.310796	1.360489
5	1.104081	1.159274	1.216653	1.276282	1.338226	1.402552	1.469328
6	1.126162	1.194052	1.265319	1.340096	1.418519	1.500730	1.586874
7	1.148686	1.229874	1.315932	1.407100	1.503630	1.605781	1.713824
8	1.171659	1.266770	1.368569	1.477455	1.593848	1.718186	1.850930
9	1.195093	1.304773	1.423312	1.551328	1.689479	1.838459	1.999005
10	1.218994	1.343916	1.480244	1.628895	1.790848	1.967151	2.158925
11	1.243374	1.384234	1.539454	1.710339	1.898299	2.104852	2.331639
12	1.268242	1.425761	1.601032	1.795856	2.012196	2.252192	2.518170
13	1.293607	1.468534	1.665074	1.885649	2.132928	2.409845	2.719624
14	1.319479	1.512590	1.731676	1.979932	2.260904	2.578534	2.937194
15	1.345868	1.557967	1.800944	2.078928	2.396558	2.759032	3.172169
16	1.372786	1.604706	1.872981	2.182875	2.540352	2.952164	3.425943
17	1.400241	1.652848	1.947904	2.292018	2.692773	3.158815	3.700018
18	1.428246	1.702433	2.025817	2.406619	2.854339	3.379932	3.996020
19	1.456811	1.753506	2.106849	2.526950	3.025599	3.616528	4.315701
20	1.485947	1.806111	2.191123	2.653298	3.207135	3.869684	4.660957
21	1.515666	1.860295	2.278768	2.785963	3.399564	4.140562	5.033834
22	1.545980	1.916103	2.369919	2.925261	3.603537	4.430402	5.436540
23	1.576899	1.973587	2.464716	3.071524	3.819750	4.740530	5.871464
24	1.608437	2.032794	2.563304	3.225100	4.048935	5.072367	6.341181
25	1.640606	2.093778	2.665836	3.386355	4.291871	5.427433	6.848475
26	1.673418	2.156591	2.772470	3.555673	4.549383	5.807353	7.396353
27	1.706886	2.221289	2.883369	3.733456	4.822346	6.213868	7.988061
28	1.741024	2.287928	2.998703	3.920129	5.111687	6.648838	8.627106
29	1.775845	2.356566	3.118651	4.116136	5.418388	7.114257	9.317275
30	1.811362	2.427262	3.243398	4.321942	5.743491	7.612255	10.062657
31	1.847589	2.500080	3.373133	4.538039	6.088101	8.145113	10.867669
32	1.884541	2.575083	3.508059	4.764941	6.453387	8.715271	11.737083
33	1.922231	2.652335	3.648381	5.003189	6.840590	9.325340	12.676050
34	1.960676	2.731905	3.794316	5.253348	7.251025	9.978114	13.690134
35	1.999890	2.813862	3.946089	5.516015	7.686087	10.676581	14.785344
36	2.039887	2.898278	4.103933	5.791816	8.147252	11.423942	15.968172
37	2.080685	2.985227	4.268090	6.081407	8.636087	12.223618	17.245626
38	2.122299	3.074783	4.438813	6.385477	9.154252	13.079271	18.625276
39	2.164745	3.167027	4.616366	6.704751	9.703507	13.994820	20.115298
40	2.208040	3.262038	4.801021	7.039989	10.285718	14.974458	21.724522
41	2.252200	3.359899	4.993061	7.391988	10.902861	16.022670	23.462483
42	2.297244	3.460696	5.192784	7.761588	11.557033	17.144257	25.339482
43	2.343189	3.564517	5.400495	8.149667	12.250455	18.344355	27.366640
44	2.390053	3.671452	5.616515	8.557150	12.985482	19.628460	29.555972
45	2.437854	3.781596	5.841176	8.985008	13.764611	21.002452	31.920449
46	2.486611	3.895044	6.074823	9.434258	14.590487	22.472623	34.474085
47	2.536344	4.011895	6.317816	9.905971	15.465917	24.045707	37.232012
48	2.587070	4.132252	6.570528	10.401270	16.393872	25.728907	40.210573
49	2.638811	4.256219	6.833349	10.921333	17.377506	27.529930	43.427419
50	2.691588	4.383906	7.106683	11.467400	18.420154	29.457025	46.901613

$(r)^n = (1 + i)^n$

Table 7

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Present Worth Factors

(To Convert Future Worth to Present Worth)

$\frac{1}{(r)^n}$ = Present Worth (at beginning of first year) of $1.00 to be spent at the end of any year, n.

Year, n	i = 2%	i = 3%	i = 4%	i = 5%	i = 6%	i = 7%	i = 8%
1	.980392	.970874	.961538	.952381	.943396	.934579	.925926
2	.961169	.942596	.924556	.907029	.889996	.873439	.857339
3	.942322	.915142	.888996	.863838	.839619	.816298	.793832
4	.923845	.888487	.854804	.822702	.792094	.762895	.735030
5	.905731	.862609	.821927	.783526	.747258	.712986	.680583
6	.887971	.837484	.790315	.746215	.704961	.666342	.630170
7	.870560	.813092	.759918	.710681	.665057	.622750	.583490
8	.853490	.789409	.730690	.676839	.627412	.582009	.540269
9	.836755	.766417	.702587	.644609	.591898	.543934	.500249
10	.820348	.744094	.675564	.613913	.558395	.508349	.463193
11	.804263	.722421	.649581	.584679	.526788	.475093	.428883
12	.788493	.701380	.624597	.556837	.496969	.444012	.397114
13	.773033	.680951	.600574	.530321	.468839	.414964	.367698
14	.757875	.661118	.577475	.505068	.442301	.387817	.340461
15	.743015	.641862	.555265	.481017	.417265	.362446	.315242
16	.728446	.623167	.533908	.458112	.393646	.338735	.291890
17	.714163	.605016	.513373	.436297	.371364	.316574	.270269
18	.700159	.587395	.493628	.415521	.350344	.295864	.250249
19	.686431	.570286	.474642	.395734	.330513	.276508	.231712
20	.672971	.553676	.456387	.376889	.311805	.258419	.214548
21	.659776	.537549	.438834	.358942	.294155	.241513	.198656
22	.646839	.521893	.421955	.341850	.277505	.225713	.183941
23	.634156	.506692	.405726	.325571	.261797	.210947	.170315
24	.621721	.491934	.390121	.310068	.246979	.197147	.157699
25	.609531	.477606	.375117	.295303	.232999	.184249	.146018
26	.597579	.463695	.360689	.281241	.219810	.172195	.135202
27	.585862	.450189	.346817	.267848	.207368	.160930	.125187
28	.574375	.437077	.333477	.255094	.195630	.150402	.115914
29	.563112	.424346	.320651	.242946	.184557	.140563	.107328
30	.552071	.411987	.308319	.231377	.174110	.131367	.099377
31	.541246	.399987	.296460	.220359	.164255	.122773	.092016
32	.530633	.388337	.285058	.209866	.154957	.114741	.085200
33	.520229	.377026	.274094	.199873	.146186	.107235	.078889
34	.510028	.366045	.263552	.190355	.137912	.100219	.073045
35	.500028	.355383	.253415	.181290	.130105	.093663	.067635
36	.490223	.345032	.243669	.172657	.122741	.087535	.062625
37	.480611	.334983	.234297	.164436	.115793	.081809	.057986
38	.471187	.325226	.225285	.156605	.109239	.076457	.053690
39	.461948	.315754	.216621	.149148	.103056	.071455	.049713
40	.452890	.306557	.208289	.142046	.097222	.066780	.046031
41	.444010	.297628	.200278	.135282	.091719	.062412	.042621
42	.435304	.288959	.192575	.128840	.086527	.058329	.039464
43	.426769	.280543	.185168	.122704	.081630	.054513	.036541
44	.418401	.272372	.178046	.116861	.077009	.050946	.033834
45	.410197	.264439	.171198	.111297	.072650	.047613	.031328
46	.402156	.256737	.164614	.105997	.068538	.044499	.029007
47	.394268	.249259	.158283	.100949	.064658	.041587	.026859
48	.386538	.241999	.152195	.096142	.060998	.038867	.024869
49	.378958	.234950	.146341	.091564	.057546	.036324	.023027
50	.371528	.228107	.140713	.087204	.054288	.033948	.021321

$$\frac{1}{(r)^n} = \frac{1}{(1+r)^n}$$

Annuity Factors

(To Convert Future Worth to Annuity)

U_n = Annuity (to be laid aside at the end of each year) to redeem $1.00 at the end of year, n.

Year, n	i = 2%	i = 3%	i = 4%	i = 5%	i = 6%	i = 7%	i = 8%
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	.495050	.492611	.490196	.487805	.485437	.483092	.480769
3	.326755	.323530	.320349	.317209	.314110	.311052	.308034
4	.242624	.239027	.235490	.232012	.228591	.225228	.221921
5	.192158	.188355	.184627	.180975	.177396	.173891	.170456
6	.158526	.154598	.150762	.147017	.143363	.139796	.136315
7	.134512	.130506	.126610	.122820	.119135	.115553	.112072
8	.116510	.112456	.108528	.104722	.101036	.097468	.094015
9	.102515	.098434	.094493	.090690	.087022	.083486	.080080
10	.091327	.087231	.083291	.079505	.075868	.072378	.069029
11	.082178	.078077	.074149	.070389	.066793	.063357	.060076
12	.074640	.070462	.066553	.062825	.059277	.055902	.052695
13	.068118	.064030	.060144	.056456	.052960	.049651	.046522
14	.062602	.058526	.054669	.051024	.047585	.044345	.041297
15	.057825	.053767	.049941	.046342	.042963	.039795	.036830
16	.053650	.049611	.045830	.042270	.038952	.035858	.032977
17	.049970	.045953	.042199	.038699	.035445	.032425	.029629
18	.046702	.042709	.038993	.035546	.032357	.029413	.026702
19	.043782	.039814	.036139	.032745	.029621	.026753	.024128
20	.041157	.037216	.033582	.030243	.027185	.024393	.021852
21	.038785	.034872	.031280	.027996	.025005	.022289	.019832
22	.036631	.032747	.029199	.025971	.023046	.020406	.018032
23	.034668	.030814	.027309	.024137	.021278	.018714	.016422
24	.032871	.029047	.025587	.022471	.019679	.017189	.014978
25	.031220	.027428	.024012	.020952	.018227	.015811	.013679
26	.029699	.025938	.022567	.019564	.016904	.014561	.012507
27	.028293	.024564	.021239	.018292	.015697	.013426	.011448
28	.026970	.023293	.020013	.017123	.014593	.012392	.010489
29	.025778	.022115	.018880	.016046	.013580	.011449	.009619
30	.024650	.021019	.017830	.015051	.012649	.010586	.008827
31	.023596	.019999	.016855	.014132	.011792	.009797	.008107
32	.022611	.019047	.015949	.013280	.011002	.009073	.007451
33	.021687	.018156	.015104	.012490	.010273	.008408	.006852
34	.020819	.017322	.014315	.011755	.009598	.007797	.006304
35	.020002	.016539	.013577	.011072	.008974	.007234	.005803
36	.019233	.015804	.012887	.010434	.008395	.006715	.005345
37	.018507	.015112	.012240	.009840	.007857	.006237	.004924
38	.017821	.014459	.011632	.009284	.007358	.005795	.004539
39	.017171	.013844	.011061	.008765	.006894	.005387	.004185
40	.016556	.013262	.010523	.008278	.006462	.005009	.003860
41	.015972	.012712	.010017	.007822	.006059	.004660	.003561
42	.015417	.012192	.009540	.007395	.005683	.004336	.003287
43	.014890	.011698	.009090	.006993	.005333	.004036	.003034
44	.014388	.011230	.008665	.006616	.005006	.003758	.002802
45	.013910	.010785	.008262	.006262	.004701	.003500	.002587
46	.013453	.010363	.007882	.005928	.004415	.003260	.002390
47	.013018	.009961	.007522	.005614	.004148	.003037	.002208
48	.012602	.009578	.007181	.005318	.003898	.002831	.002040
49	.012204	.009213	.006857	.005040	.003664	.002639	.001886
50	.011823	.008866	.006550	.004777	.003443	.002460	.001743

$$U_n = \frac{i}{(1+r)^n - 1}$$

← Table 8

3.300 Present Worth Factors (Table 8).

3.310 Present worth factors are the reciprocals of compound interest factors. The table of present worth factors gives the present worth of a future worth. That is, it gives today's value of some amount occurring in the future. Another way of defining the factors in the present worth table is that they are the money now which, at compound interest, or cost of money, will amount to a $1.00 at a future date. This factor is a kind of "discount" factor, for it will show to what $1.00 (at "n" years from now) is equal today or at "zero date." To find how much money must be put out at compound interest today to amount to a given sum in the future, the proper factor must be multiplied by the amount to be had in the future. For instance, what is the present worth of $237 ten years from now at 7 per cent cost of money? The factor for 10 years at 7 per cent is .508349, which must be multiplied by $237, i.e., .508349 x 237 = $120.48.

Lump sum depreciation and non-recurring expenses, whenever they occur, are converted into a present worth by multiplying by the factor from *Table 8* for the time between now and the date the lump sum depreciation or the non-recurring expense occurs and at the rate of money.

3.320 The formula for the present worth factors is

$1/A_n = 1/(1 + i)^n$ where

n is the number of years.

i is the cost of money expressed as a decimal.

A is the amount.

$1/A_n$ is the present worth of a future worth.

3.400 Annuity Factors (Table 9).

3.410 In considering the compound interest and the present worth factors, only a single item of principal was involved, and the compound interest on that principal was used. In studying annuity factors, a new interest-bearing principal each year must be considered. Annuity factors give the principal which must be put out each year at compound interest so that the sum of the principals and their compound interests will total $1.00 at the end of the desired number of years.

These factors indicate what sum of money must be paid annually which, with compound interest on each of the payments, will amount to $1.00 in the required number of years. Table 9,

← Table 9

Table 10 →

then, is of factors for converting a future worth into an annual payment, annuity, or annual charge.

3.411 *An annuity* is a series of like payments, one of which is made at the end of each year for a period of years.

3.412 *Annuity Factors and Annuity Depreciation Rates.* Since these annual payments with their accumulated compound interests amount to a definite sum at the end of a given number of years, these factors are the *rate of depreciation* on an annuity basis of an item *when the net salvage is O* at the end of the life of the item. For such an item, find the factor corresponding to the years in the life at the C/M rate used. This factor is then the annual depreciation rate expressed decimally, and may be converted into a per cent by moving the decimal point two places to the right. For instance, if some item of property or plant has a life of 13 years, at the end of which time its net salvage is 0, then at a 7 per cent cost of money rate, its depreciation rate is 4.9651 per cent per year. This depreciation is on the annuity basis.

The *annuity depreciation rate* for an item may be found by using the annuity factors, if the service life and net salvage are given. In Paragraph 2.323, the net salvage is subtracted from the first cost to obtain the lump sum depreciation. If the net salvage is expressed as a per cent, then the lump sum depreciation is 100 per cent minus the net salvage per cent. Find the annuity factor corresponding to the service life at the cost of money rate used, and multiply it into the depreciation per cent, obtaining the depreciation on an annuity basis.

Suppose an item has a service life of 23 years, net salvage of 8 per cent, and the cost of money is 6 per cent. Reference to the annuity factor table gives .021278 as the factor for 23 years at 6 per cent cost of money. Then .021278 x (100 per cent — 8 per cent) = 1.96 per cent, the annuity depreciation. If the total depreciation is given in dollars, then the multiplication will give the annuity depreciation in dollars per year.

3.420 The formula for annuity factors is

$U_n = i / [(1 + i)^n - 1]$ where

U_n is the annuity factor.

i is the cost of money expressed as a decimal.

n is the number of years.

Table 11 →

Annuity Cumulation Factors

(To Convert Annuity to Future Worth)

V_n = Amount of an Annuity of $1.00 (to be laid aside at end of each year) at the end of any year, n.

Year, n	i = 2%	i = 3%	i = 4%	i = 5%	i = 6%	i = 7%	i = 8%
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	2.02	2.03	2.04	2.05	2.06	2.07	2.08
3	3.0604	3.0909	3.1216	3.1525	3.1836	3.2149	3.2464
4	4.121608	4.183627	4.246464	4.310125	4.374616	4.439943	4.506112
5	5.204040	5.309136	5.416323	5.525631	5.637093	5.750739	5.866601
6	6.308121	6.468410	6.632975	6.801913	6.975319	7.153291	7.335929
7	7.434283	7.662462	7.898294	8.142008	8.393838	8.654021	8.922803
8	8.582969	8.892336	9.214226	9.549109	9.897468	10.259803	10.636628
9	9.754628	10.159106	10.582795	11.026564	11.491316	11.977989	12.487558
10	10.949721	11.463879	12.006107	12.577893	13.180795	13.816448	14.486562
11	12.168715	12.807796	13.486351	14.206787	14.971643	15.783599	16.645487
12	13.412090	14.192030	15.025805	15.917127	16.869941	17.888451	18.977126
13	14.680332	15.617790	16.626838	17.712983	18.882138	20.140643	21.495297
14	15.973938	17.086324	18.291911	19.598632	21.015066	22.550488	24.214920
15	17.293417	18.598914	20.023588	21.578564	23.275970	25.129022	27.152114
16	18.639825	20.156881	21.824531	23.657492	25.672528	27.888054	30.324283
17	20.012071	21.761588	23.697512	25.840366	28.212880	30.840217	33.750226
18	21.412312	23.414435	25.645413	28.132385	30.905653	33.999033	37.450244
19	22.840559	25.116868	27.671229	30.539004	33.759992	37.378965	41.446263
20	24.297370	26.870374	29.778079	33.065954	36.785591	40.995492	45.761964
21	25.783317	28.676486	31.969202	35.719252	39.992727	44.865177	50.422921
22	27.298984	30.536780	34.247970	38.505214	43.392290	49.005739	55.456755
23	28.844963	32.452884	36.617889	41.430475	46.995828	53.436141	60.893296
24	30.421862	34.426470	39.082604	44.501999	50.815577	58.176671	66.764759
25	32.030300	36.459264	41.645908	47.727099	54.864512	63.249038	72.103960
26	33.670906	38.553042	44.311745	51.113454	59.156383	68.676470	79.954415
27	35.344324	40.709634	47.084214	54.669126	63.705766	74.483823	87.350768
28	37.051210	42.930923	49.967583	58.402583	68.528112	80.697691	95.338830
29	38.792235	45.218850	52.966286	62.322712	73.639798	87.346529	103.965936
30	40.568079	47.575416	56.084938	66.438848	79.058186	94.460786	113.283211
31	42.379441	50.002678	59.328335	70.760790	84.801677	102.073041	123.345868
32	44.227030	52.502759	62.701469	75.298829	90.889778	110.218156	134.213537
33	46.111570	55.077841	66.209527	80.063771	97.343165	118.933425	145.950620
34	48.033802	57.730177	69.857909	85.066959	104.183755	128.258765	158.626670
35	49.994478	60.462082	73.652225	90.320308	111.434780	138.236878	172.316804
36	51.994367	63.275944	77.598314	95.836323	119.120867	148.913460	187.102148
37	54.034255	66.174223	81.702246	101 628139	127.268119	160.337402	203.070320
38	56.114940	69.159449	85.970336	107.709546	135.904206	172.561020	220.315945
39	58.237238	72.234233	90.409150	114.095023	145.058458	185.640292	238.941221
40	60.401983	75.401260	95.025516	120.799774	154.761966	199.635112	259.056519
41	62.610023	78.663298	99.826536	127.739763	165.047684	214.609570	280.781040
42	64.862223	82.023196	104.819398	135.231751	175.950545	230.632240	304.243523
43	67.159468	85.483892	110.012382	142.993339	187.507577	247.776497	329.583005
44	69.502657	89.048409	115.412877	151.143006	199.758032	266.120851	356.949646
45	71.892710	92.719861	121.029392	159.700156	212.743514	285.749311	386.505617
46	74.330564	96.501457	126.870568	168.685164	226.508125	306.751763	418.426067
47	76.817176	100.396501	132.945390	178.119422	241.098612	329.224386	452.900152
48	79.353519	104.408396	139.263206	188.025393	256.564529	353.270093	490.132164
49	81.940590	108.540648	145.833734	198.426663	272.958401	378.999000	530.342737
50	84.579401	112.796867	152.667084	209.347996	290.335905	406.528929	573.770156

$$V_n = \frac{(1+i)^n - 1}{i}$$

Factors for Present Worth of Annuity

(To Convert Annuity to Present Worth)

W_n = Present Worth (at beginning of first year) of an annual charge of $1.00 to be made at the end of each year up to and including the nth year

Year, n	i = 2%	i = 3%	i = 4%	i = 5%	i = 6%	i = 7%	i = 8%
1	0.980392	0.970874	0.961538	0.952381	0.943396	0.934579	0.925926
2	1.941561	1.913470	1.886095	1.859410	1.833393	1.808018	1.783265
3	2.883883	2.828611	2.775091	2.723248	2.673012	2.624316	2.577097
4	3.807729	3.717098	3.629895	3.545951	3.465106	3.387211	3.312127
5	4.713460	4.579707	4.451822	4.329477	4.212364	4.100197	3.992710
6	5.601431	5.417191	5.242137	5.075692	4.917324	4.766540	4.622880
7	6.471991	6.230283	6.002055	5.786373	5.582381	5.389289	5.206370
8	7.325481	7.019692	6.732745	6.463213	6.209794	5.971299	5.746639
9	8.162237	7.786109	7.435332	7.107822	6.801692	6.515232	6.246888
10	8.982585	8.530203	8.110896	7.721735	7.360087	7.023582	6.710081
11	9.786848	9.252624	8.760477	8.306414	7.886875	7.498674	7.138964
12	10 575341	9 954004	9.385074	8.863252	8.383844	7.942686	7.536078
13	11.348374	10.634955	9.985648	9.393573	8.852683	8.357651	7.903776
14	12.106249	11.296073	10.563123	9.898641	9.294984	8.745468	8.244237
15	12.849264	11.937935	11.118387	10.379658	9.712249	9.107914	8.559479
16	13.577709	12.561102	11.652296	10.837770	10.105895	9.446649	8.851369
17	14.291872	13.166118	12.165669	11.274066	10.477260	9.763223	9.121638
18	14.992031	13.753513	12.659297	11.689587	10.827603	10.059087	9.371887
19	15.678462	14.323799	13.133939	12.085321	11.158116	10.335595	9 603599
20	16.351433	14.877475	13.590326	12.462210	11.469921	10.594014	9.818147
21	17 011209	15.415024	14.029160	12.821153	11.764077	10 835527	10 016803
22	17.658048	15.936917	14.451115	13.163003	12 041582	11.061241	10.200744
23	18.292204	16.443608	14.856842	13.488574	12.303379	11.272187	10.371059
24	18.913926	16.935542	15.246963	13.798642	12.550358	11.469334	10.528758
25	19.523456	17.413148	15.622080	14.093945	12.783356	11.653583	10.674776
26	20.121035	17.876842	15.982769	14.375185	13.003166	11.825779	10.809978
27	20.706898	18.327031	16.329586	14.643034	13.210534	11 986709	10 935165
28	21.281272	18 764108	16.663063	14.898127	13.406164	12.137111	11 051078
29	21 844385	19.188455	16.983715	15.141074	13 590721	12.277674	11.158406
30	22.396456	19.600441	17.292033	15.372451	13.764831	12.409041	11.257783
31	22 937702	20.000428	17.588494	15.592811	13.929086	12.531814	11 349799
32	23.468335	20.388766	17.873552	15 802677	14.084043	12 646555	11 434999
33	23.988564	20.765792	18.147646	16.002549	14.230230	12.753790	11 513888
34	24.498592	21.131837	18.411198	16.192904	14.368141	12.854009	11 586934
35	24.998619	21 487220	18.664613	16.374194	14.498246	12.947672	11.654568
36	25.488842	21.832253	18.908282	16.546852	14.620987	13.035208	11.717193
37	25.969453	22.167235	19.142579	16.711287	14.736780	13.117017	11.775178
38	26.440641	22 492462	19.367864	16.867893	14.846019	13.193473	11.828869
39	26.902589	22.808215	19.584485	17.017041	14.949075	13.264928	11.878582
40	27.355479	23.114772	19.792774	17.159086	15.046297	13.331709	11.924613
41	27.799489	23.412400	19.993052	17.294368	15.138016	13.394120	11 967235
42	28.234794	23.701359	20.185627	17.423208	15.224543	13.452449	12 006699
43	28.661562	23.981902	20.370795	17.545912	15.306173	13.506962	12 043240
44	29.079963	24.254274	20.548841	17.662773	15.383182	13.557908	12.077074
45	29.490160	24.518713	20.720040	17.774070	15.455832	13 605522	12.108402
46	29.892314	24.775449	20.884654	17.880067	15.524370	13.650020	12.137409
47	30.286582	25.024708	21.042936	17.981016	15.589028	13 691608	12.164267
48	30.673120	25.266707	21.195131	18.077158	15.650027	13.730474	12.189136
49	31.052078	25 501657	21.341472	18.168722	15.707572	13.766799	12 212163
50	31.423606	25.729764	21.482185	18.255925	15.761861	13.800746	12.233485

$$W_n = \frac{1 - (1+i)^{-n}}{i}$$

3.500 Annuity Cumulation Factors (Table 10).

3.510 Annuity cumulation factors show the sum to which a series of annual payments of $1.00 at compound interest will amount at the end of a period of years. If $1.00 is laid aside each year at compound interest, at the end of a number of years, these $1.00 annual deposits with accumulated compound interest (i.e., cost of money) on each $1.00 deposit will add up to the amounts or factors indicated on the table. For any number of dollars other than $1.00, the amount can be found by multiplying the factor by the number of dollars laid aside annually.

Assuming the annual payments are $1.00, the amount at the end of the first year is the dollar then paid. At the end of the second year, the amount is the first year's dollar plus one year's interest plus the dollar paid at the end of the second year. At the end of the third year, the amount is the first year's dollar plus compound interest on that dollar for two years, plus the second year's dollar with one year's interest on it, plus the third year's dollar then paid. Thus, it can be seen, the annuity cumulation factor for any period of years is equal to 1 plus the sum of the compound interest factors (Paragraph 3.200) for all the preceding years. Annuity cumulation factors convert an annuity or annual charge into a future worth. The annuity cumulation factor is the reciprocal of the annuity factor. (Paragraph 3.420).

3.520 The formula for the annuity cumulation factor is

$V_n = [(1 + i)^n - 1] / i$ where

V_n is the annuity cumulation factor.

i is the cost of money expressed as a decimal.

n is the number of years.

3.600 Factors for Present Worth of an Annuity (Table 11).

3.610 The factors in this table give the present worth, or value of a series of payments of $1.00 to be made at the end of each year up to and including some predetermined number of years. Each future payment is considered in the light of its value today; that is, each future payment is discounted, from the date it is to be paid, back to today. These present-day values being totalled produce the factor for the Present Worth of an Annuity for the number of payments (i.e., years) involved. Thus, the factor for the present worth of an annuity becomes the sum of a number of present worth factors.

Another way of considering these factors is that each represents the sum which must be invested at compound interest (i.e., cost of money) now to produce $1.00 to be withdrawn annually over the period of years under consideration. Present worth of an annuity is, many times, called present worth of an annual charge. These factors convert an annuity or annual charge into a present worth.

Factors for Annuity of Present Worth

(To Convert Present Worth to Annuity)

Y_n = Annuity (to be laid aside at the end of each year for n years) equivalent to $1.00 at beginning of first year.

Year, n	i = 2%	i = 3%	i = 4%	i = 5%	i = 6%	i = 7%	i = 8%
1	1.020000	1.030000	1.040000	1.050000	1.060000	1.070000	1.080000
2	.515049	.522611	.530196	.537805	.545437	.553092	.560769
3	.346755	.353530	.360349	.367209	.374110	.381052	.388034
4	.262624	.269027	.275490	.282012	.288591	.295228	.301921
5	.212158	.218355	.224627	.230975	.237396	.243891	.250455
6	.178526	.184598	.190762	.197017	.203363	.209796	.216315
7	.154512	.160506	.166610	.172820	.179135	.185553	.192072
8	.136510	.142456	.148528	.154722	.161036	.167468	.174015
9	.122515	.128434	.134493	.140690	.147022	.153486	.160079
10	.111327	.117231	.123291	.129505	.135868	.142377	.149029
11	.102178	.108077	.114149	.120389	.126793	.133357	.140076
12	.094560	.100462	.106552	.112825	.119277	.125902	.132695
13	.088118	.094030	.100144	.106456	.112960	.119651	.126522
14	.082602	.088526	.094669	.101024	.107585	.114345	.121297
15	.077825	.083767	.089941	.096342	.102963	.109795	.116830
16	.073650	.079611	.085820	.092270	.098952	.105858	.112977
17	.069970	.075953	.082199	.088699	.095445	.102425	.109629
18	.066702	.072709	.078993	.085546	.092357	.099413	.106702
19	.063782	.069814	.076139	.082745	.089621	.096753	.104128
20	.061157	.067216	.073582	.080243	.087185	.094393	.101852
21	.058785	.064872	.071280	.077996	.085005	.092289	.099832
22	.056631	.062747	.069199	.075971	.083046	.090406	.098032
23	.054668	.060814	.067309	.074137	.081278	.088714	.096422
24	.052871	.059047	.065587	.072471	.079679	.087189	.094978
25	.051220	.057428	.064012	.070952	.078227	.085811	.093679
26	.049699	.055938	.062567	.069564	.076904	.084561	.092507
27	.048293	.054564	.061239	.068292	.075697	.083426	.091448
28	.046990	.053293	.060013	.067123	.074593	.082392	.090489
29	.045778	.052115	.058880	.066046	.073580	.081449	.089619
30	.044650	.051019	.057830	.065051	.072649	.080586	.088827
31	.043596	.049999	.056855	.064132	.071792	.079797	.088107
32	.042611	.049047	.055949	.063280	.071002	.079073	.087451
33	.041687	.048156	.055104	.062490	.070273	.078408	.086852
34	.040819	.047322	.054315	.061755	.069598	.077797	.086304
35	.040002	.046539	.053577	.061072	.068974	.077236	.085803
36	.039233	.045804	.052887	.060434	.068395	.076715	.085345
37	.038507	.045112	.052240	.059840	.067857	.076237	.084924
38	.037821	.044459	.051632	.059284	.067358	.075795	.084539
39	.037171	.043844	.051061	.058765	.066894	.075387	.084185
40	.036556	.043262	.050523	.058278	.066461	.075009	.083860
41	.035972	.042712	.050017	.057822	.066059	.074660	.083561
42	.035417	.042192	.049540	.057395	.065683	.074336	.083287
43	.034890	.041698	.049090	.056993	.065333	.074036	.083034
44	.034388	.041230	.048665	.056616	.065006	.073758	.082802
45	.033910	.040785	.048262	.056262	.064700	.073500	.082587
46	.033453	.040363	.047882	.055928	.064415	.073260	.082390
47	.033018	.039961	.047522	.055614	.064148	.073037	.082208
48	.032602	.039576	.047181	.055318	.063898	.072831	.082040
49	.032204	.039213	.046857	.055040	.063664	.072639	.081886
50	.031823	.038865	.046550	.054777	.063444	.072460	.081743

$$Y_n = \frac{i}{1 - (1 + i)^{-n}}$$

Table 12

3.620 The formula for factors for Present Worth of an Annuity is

$W_n = [1 - (1 + i)^{-n}] / i$ where

W_n is the present worth of annuity factor.

i is the cost of money expressed as a decimal.

n is the number of years.

3.700 Factors for Annuity of a Present Worth (Table 12).

3.710 The factors in this table show the sums of money that must be laid aside at the end of *each year* which, at the end of a number of years. produce, with accumulated compound interest (i.e., cost of money), the same amount as if $1.00 were laid aside at the beginning of the period with no other sums thereafter. Or, it shows the factors to convert a present worth into an annual charge. Factors for the annuity of a present worth are reciprocals of the corresponding factors for the present worth of an annuity.

3.720 The formula for the Annuity of a Present Worth is

$Y_n = i / [1 - (1 + i)^{-n}]$ where

Y_n is the factor for annuity of a present worth.

i is the cost of money expressed as a decimal.

n is the number of years.

(To Be Continued)

General of Indiana Names Marketing Director

William L. Heston has been appointed to the newly-created position of director of marketing and merchandising of the General Telephone Co. of Indiana.

During his five years with the company, Mr. Heston has served as commercial engineer, commercial survey engineer, sales supervisor, and merchandising supervisor.

He was graduated from Purdue University and is a member of the National Sales Executive Club.

The appointment was effective Mar. 1.

THE Plant Man's Notebook

BY RAY BLAIN, TECHNICAL EDITORIAL DIRECTOR

WE HEAR many arguments these days for and against the joint use of poles for telephone and power service. Being familiar with the fact that the REA has made quite a study of the subject we requested the opinions of their representatives. Their comments were so illuminating that we are going to pass them along to Independent operating companies for consideration in making decisions on joint use. Here's what they say:

"First, we must understand that many of the problems blamed on joint use should be attributed to the fact that power lines exist in the same areas where telephone lines must be constructed. If power systems did not exist, telephone plant construction and maintenance would indeed be greatly simplified. The true fact of the matter, however, is that telephone subscribers also want to be power customers so we are faced with the need for the two types of facilities serving the same areas and customers.

"With this concept in mind, we are better able to analyze more fairly what the advantages and disadvantages of joint use of poles for the two types of facilities are.

"If separate pole lines are used, the following problems pertain:

"(1) The telephone lines are exposed to induction from the power lines and must be carefully balanced to avoid noise. The exposure will be irregular, i.e., separation between the two facilities will vary by roadway conditions or right-of-way difficulties. This means that transpositions in the telephone plant will be less effective in minimizing noise.

"(2) Two rights-of-way with attendant initial tree clearing and annual reclearing will be required.

"(3) The telephone plant will be involved in crossings with the power lines and exposed to contact. A right angle crossing between telephone conductors and power conductors on supports is the condition most prone to have contacts under storm loading. Since frequent crossings will exist, the telephone plant must be constructed and protected to handle possible power contacts. The REA advocates joint pole crossings instead of separate crossings for two reasons:

"(a) It inherently minimizes the possibility of contact.

"(b) It provides a means to get to the multigrounded neutral of the power system for connection of protective devices. The voltage of the power system is not the determining factor in devising protection schemes. A 7200/12450-volt multigrounded neutral power system is less of a hazard to the telephone plant than a 2400-volt delta system. This is because the 7200-volt system uses ground relaying and can utilize circuit breakers with fast clearing times. If the telephone plant has devices that will ground the power system in the event of a contact, fast clearing is assured. In any event, the problem of protection exists irrespective of whether joint use or separate lines are used.

"With joint use of poles, the following problems exist:

"(1) The coupling between the power and telephone circuits is increased over roadway separation so the need for well-balanced telephone circuits is somewhat increased. On the other hand, the uniformity of separation is much better, so transpositions are more effective. REA borrowers have about 40,000 miles of telephone circuits involved in joint use and experience has shown that when the telephone circuit is well balanced, noise conditions are satisfactory. The difference in coupling between roadway separation and joint use is not sufficient to cause or eliminate a noise problem.

"(2) One right-of-way to be cleared and maintained instead of two is required. On an annual cost basis, the savings in reclearing expenses are one of the major factors favoring joint use. In the usual case, the clearing costs are split between the two utilities with economies to both over maintenance of separate rights-of-way. The investment and maintenance of one instead of two pole lines also, result in economies.

"A right-of-way for two pole lines is often difficult to obtain. In Connecticut, for instance, the highway department will not permit separate pole line construction on a highway right-of-way. The public favors one pole line over two.

"(3) Contacts between the two facilities may occur in the joint use situation. Likewise, electric induction requires the use of drainage units on open wire telephone circuits. The sag under load of telephone wires is much greater than commonly used power conductors so in-line contacts are not frequent if proper separations between facilities are maintained in construction. Protective devices exist to safely handle contacts providing they are properly installed and maintained.

"The Bell System employs joint use on over two million poles in rural areas with long-span construction. Obviously, this would not be the case if operating experience indicated a safety hazard. Likewise, it is difficult to understand how this amount of joint use would be employed if it were not economical to the operating companies.

"(4) In the event of storms and when damage to plant exists there is, of course, the need to evolve coordinated approaches to restoration of service. This is usually worked out in advance of the storms, with the result that each company may carry out restoration of its most essential facilities on a primary basis.

"In many cases, joint headquarters are established to expedite dispatch of line crews, etc., to ensure optimum coordination. Without coordination, the telephone company is at a serious disadvantage in restoring service even on separate pole line construction since contacts at crossarms, etc., will present real hazards.

"Generally, toll lines are not employed in extensive joint use with power lines so that this essential facility is not as much affected by accidents to the power lines. The use of separate pole lines for toll is further favored since the routing is not controlled solely by subscriber locations and, therefore, need not be in conflict with power lines."

Joint use obviously is not a magic cure-all for problems, but, in many cases, it can be considered as a good engineering solution to the construction of telephone and power facilities to serve the public with the least over-all cost.

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It has been said that next in importance to having a great aim is to know when to pull the trigger.

TELEPHONY'S Traffic Engineering Handbook

By Gilbert R. Brackett **March 22, 1958**

Section 12 (continued)
Traffic Engineering
Short Cuts—Automatic

The results of these computations (to determine probable volume of busy-hour traffic and its distribution) are tabulated in the following manner:

TRAFFIC DISTRIBUTION TABLE

(1)	1-Year Period Total Number of			Two-Year Period Total Number of			Five-Year Period Total Number of		
	Lines (2)	BH Calls (3)	BH CCS (4)	Lines (5)	BH Calls (6)	BH CCS (7)	Lines (8)	BH Calls (9)	BH CCS (10)
(1) Ext. to ext.	110	69	63	130	82	74	190	120	108
(2) Ext. to C.O. 9th level	110	92	147	130	109	174	190	160	255
(3) Ext. to tie line	110	4	8	130	5	9	190	8	13
(4) Opr. to L.D.	110	3	7	130	4	8	190	6	11
(5) Misc.	110	13	7	130	16	8	190	23	11
(6) Ext to "O" level	110	27	32	130	33	37	190	48	52
(7) Total Orig. Traffic	110	192	250	130	229	294	190	336	428
(8) Inc. from C.O.	110	132	290	130	156	343	190	228	502

Using the traffic distribution as a guide, the traffic engineer estimates the number of line finders, selectors, connectors and trunks required to handle the traffic occurring at the various periods.

Line Finder Requirements

Assume that the line finders are filled to their capacity of 196 lines. Line finders are arranged in groups, and the number of line finders in a group is dependent upon the volume of traffic originating at the 196 lines during the busy hour. For example:

Period	Lines in Service		Line Finder Terminals Available		Line Finder Groups Required
1-year	110	÷	196	=	.56 or 1 group
2-year	130	÷	196	=	.66 or 1 group
5-year	190	÷	196	=	.97 or 1 group

The number of line finders required per group is obtained by:

(1) Multiplying the number of lines in service at the yearly period by the total busy-hour originating CCS factor. Example: The lines in service will be 110 in one year, 130 in two years and 190 in five years. According to the Busy Hour Basic Data Table (TELEPHONY, Mar. 15, p. 32), item 7, column 4, the total originating CCS per line factor is 2.26. Multiplying 110, 130 and 190 lines by 2.26, the resultant busy hour CCS for each yearly period is:

Period	Lines in Service		Busy Hour Originating CCS Factor		Total Originating CCS Factor
1-year	110	×	2.26	=	249
2-year	130	×	2.26	=	294
5-year	190	×	2.26	=	429

Hundred Call Seconds and Per Cent Use at Various Service Levels for Group Sizes of 1 to 50

The table number indicates the number of calls per 1000 encountering all equipment in the group busy

Trunks	TABLE 1		TABLE 5		TABLE 10		TABLE 20		TABLE 30		TABLE 40		Trunks
	CCS	% Usage	CCS	% Usage	CCS	% Usage	CCS	% Usage	CCS	% Usage	CCS	% Usage	
1	.1	.1	.2	.5	.4	1.0	.7	2.0	1.1	3.1	1.5	4.2	1
2	1.6	2.3	3.7	4.8	5.4	7.5	7.9	10.9	9.7	13.5	11.3	15.7	2
3	6.9	6.4	12.2	11.3	15.7	14.5	20.4	18.9	24.0	22.2	26.9	24.9	3
4	15.4	10.7	24.2	16.8	29.6	20.6	36.7	25.5	41.6	28.9	45.7	31.8	4
5	26.6	14.8	38.9	21.6	46.1	25.6	55.8	31.0	61.6	34.2	66.6	37.0	5
6	40.0	18.5	55.4	25.7	64.4	29.8	76.0	35.2	82.8	38.3	89.3	41.3	6
7	54.7	21.7	73.4	29.1	83.9	33.3	96.8	38.4	105	41.7	112	44.4	7
8	70.9	24.6	92.5	32.1	105	36.5	119	41.3	129	44.8	137	47.6	8
9	88.2	27.2	113	34.9	126	38.9	142	43.8	153	47.2	162	50.0	9
10	107	29.7	134	37.2	149	41.4	166	46.1	178	49.4	188	52.2	10
11	126	31.8	156	39.4	172	43.4	191	48.2	204	51.5	214	54.0	11
12	145	33.6	178	41.2	195	45.1	216	50.0	230	53.3	240	55.6	12
13	165	35.5	201	42.9	220	47.0	241	51.5	256	54.7	267	57.1	13
14	187	37.1	224	44.4	244	48.4	267	53.0	283	56.1	296	58.5	14
15	208	38.5	248	45.9	269	49.8	293	54.3	310	57.4	322	59.6	15
16	231	40.0	273	47.4	294	51.1	320	55.5	337	58.5	350	60.8	16
17	253	41.3	297	48.5	320	52.3	347	56.7	365	59.6	378	61.8	17
18	276	42.6	322	49.7	345	53.4	374	57.7	392	60.5	407	62.8	18
19	299	43.7	347	50.7	373	54.5	401	58.6	420	61.4	436	63.8	19
20	323	44.9	373	51.8	399	55.4	429	59.6	449	62.4	465	64.6	20
21	346	45.8	399	52.8	426	56.4	458	60.6	478	63.2	494	65.3	21
22	370	46.7	424	53.5	453	57.2	486	61.4	507	64.0	523	66.0	22
23	395	47.7	451	54.5	480	58.0	514	62.1	536	64.7	552	66.7	23
24	419	48.5	477	55.2	507	58.7	542	62.9	564	65.3	582	67.4	24
25	444	49.3	504	56.0	535	59.4	571	63.4	593	65.9	611	67.9	25
26	469	50.1	531	56.7	562	60.1	599	64.0	623	66.6	641	68.5	26
27	495	50.9	558	57.4	590	60.7	627	64.5	652	67.1	671	68.9	27
28	520	51.6	585	58.0	618	61.3	656	65.1	682	67.7	701	69.6	28
29	545	52.2	612	58.6	647	62.0	685	65.6	711	68.1	731	70.0	29
30	571	52.9	640	59.3	675	62.5	715	66.2	741	68.6	762	70.6	30
31	597	53.5	667	59.8	703	63.0	744	66.7	771	69.1	792	71.0	31
32	624	54.2	695	60.3	732	63.6	773	67.1	801	69.5	822	71.4	32
33	650	54.7	723	60.8	760	64.0	803	67.6	831	69.9	852	71.7	33
34	676	55.2	751	61.4	789	64.5	832	68.0	861	70.3	883	72.1	34
35	703	55.8	779	61.8	818	64.9	862	68.4	891	70.7	913	72.5	35
36	729	56.3	807	62.3	847	65.4	892	68.8	922	71.1	944	72.8	36
37	756	56.8	836	62.8	878	65.8	922	69.2	952	71.5	975	73.2	37
38	783	57.3	864	63.2	905	66.2	952	69.6	982	71.8	1006	73.5	38
39	810	57.7	892	63.5	935	66.6	982	69.9	1013	72.1	1037	73.9	39
40	837	58.1	921	64.0	964	66.9	1012	70.3	1043	72.4	1069	74.2	40
41	865	58.6	950	64.4	993	67.3	1042	70.6	1074	72.8	1099	74.4	41
42	892	59.0	979	64.7	1023	67.7	1072	70.9	1104	73.0	1130	74.7	42
43	919	59.4	1008	65.1	1052	68.0	1103	71.3	1135	73.3	1161	75.0	43
44	947	59.8	1036	65.4	1082	68.3	1133	71.5	1166	73.6	1192	75.3	44
45	975	60.2	1066	65.8	1112	68.6	1164	71.8	1197	73.9	1223	75.5	45
46	1003	60.6	1095	66.1	1142	69.0	1194	72.1	1228	74.2	1256	75.8	46
47	1030	60.9	1124	66.4	1171	69.2	1225	72.4	1259	74.4	1286	76.0	47
48	1058	61.2	1153	66.7	1201	69.5	1255	72.6	1291	74.7	1317	76.2	48
49	1086	61.6	1183	67.1	1231	69.8	1286	72.9	1322	74.9	1349	76.5	49
50	1115	61.9	1212	67.3	1261	70.1	1317	73.2	1353	75.2	1381	76.7	50

Trunk Capacity Table

(2) Referring to the accompanying Trunk Capacity Table, sub-table 10, we find the number of line finders necessary to handle each busy hour originating CCS will be:

249 CCS calls for 15 line finders.

294 CCS calls for 16 line finders.

429 CCS calls for 22 line finders.

A summary of the preceding computations shows the number of line finder groups and switches needed to handle the busy hour originating estimated traffic will be:

Period	Lines In Service	Originating Busy Hour CCS	Line Finder Required Groups	Switches
1-year	110	249	1	15
2-year	130	294	1	16
5-year	190	429	1	22

(Section 12 will be continued next week)

Pole Climbing Equipment

By JOHN A. BRACKEN

Part 2

WHETHER a man working on a telephone pole is protected against falling depends on how secure his support is; therefore, in order to insure the security of his support while aloft, it is essential that he wear an approved body belt and safety strap, either fabric (nylon) or leather.

From the standpoint of safety and comfort, it is important that the body belt fits the wearer properly, as indicated by the distance between the belt "D" rings. This distance should allow the "D" rings to position themselves just in front of the prominent portion of the wearer's hip bones.

Placing a tape across the wearer's back and measuring the distance between the hip bones will indicate the proper body belt size, which is usually plainly marked on the belt.

Safety straps are available in two sizes—short and long. The size selected depends upon: (1) The predominence of pole size worked on, and (2) the body height and length of arms of the workman who uses it.

Fig. 1

Preparatory to using the body belt and safety strap, the workman first buckles the belt comfortably around his waist, taking care to see that the belt buckle tongue is properly seated in the selected hole in the belt fastening strap, and that the end of the strap is placed through the keeper.

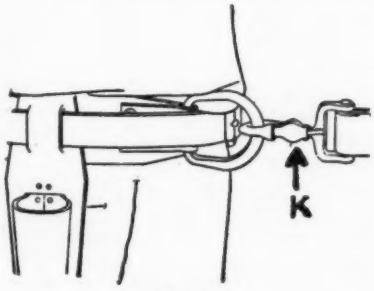


Fig. 2

He then adjusts the safety strap to the desired length and fastens both snap-hooks, attached to each end of the safety strap, to the body belt right hand "D" ring, if he is left handed; or to the left hand "D" ring, if right handed. He is now ready to work on poles.

Upon climbing a pole to the desired location, and while holding to the pole with his right hand, the workman unfastens the snap-hook of the required end of the safety strap from the body belt "D" ring with his left hand, and passes the strap around the pole and grasps it with the fingers of the right hand, as shown in *Fig. 1.*

Holding to the pole with the left hand and taking care to see that the safety strap is not twisted, but rests flat against the pole, the workman fastens the safety strap snap-hook to the "D" ring on the right side of the body belt with his right hand.

Being aware that he may experience a fall which could result in a serious or fatal injury if he relies upon the click heard when the snap-hook engages the "D" ring to mean that the snap-hook is securely in place, the workman takes particular care to see that the snap-hook is actually engaged in the body belt "D" ring; that the snap-hook keeper is fully closed and turned away from his body as shown "K" in *Fig. 2.*

By holding to the pole, crossarm or other support with both hands, the workman then tests the security of the safety strap by letting his weight gradually back against the strap until assured it is safe, as shown in *Fig. 3.*

Upon being satisfied that the strap will support him in complete safety, the workman releases his hold and goes about the performance of his job.

When ready to descend the pole, the workman grasps the pole with one hand and releases the weight of his body from the safety strap by drawing slightly toward the pole. He then unfastens the safety strap snap-hook attached to the right hand "D" ring and proceeds to remove the safety strap from around the pole in reverse order in which it was placed.

In view of the fact, that workmen trust their lives to a body belt and safety strap many times in a day's work, the following precautions relative to using the belt and strap may be of assistance to beginners in assuring the highest degree of safety:

(1) When working on telephone poles with a body belt and safety strap, learn to relax. That is, so limber the muscular system that no nervous ten-

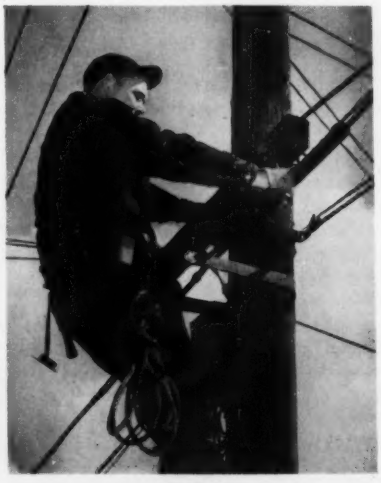


Fig. 3

sion or strain remains. By cultivating an "at home" feeling, there will be less fear of falling, as well as experiencing more freedom in action.

(2) Avoid fatigue from working on poles—when physically tired, it is easy to allow trivial incidents to happen which might cause accidents.

(3) When working aloft on a pole, avoid over-reaching, either sidewise or high up. It is safer to change positions.

(4) Avoid becoming unbalanced while working aloft. For example, a body belt weighted heavily with tools, could cause unbalance.

(5) While on a pole, take a position in such manner that the feet and the body will not be strained unduly. To do this, set the climber gaffs in the pole so that one foot is placed slightly above the other, stiffen both legs and allow the weight of the body to be supported by the safety strap and lower foot. Use the upper foot and leg principally to balance the body and for slight shifting about the pole.

(6) Care must be taken to see that clothing does not interfere with the free use of the safety strap and access to the body belt "D" rings. For example, if a coat is worn, the body belt should be placed on the outside so that the "D" rings can be seen and easily reached.

(7) Body belts and safety straps should not be used for any other purpose than that for which they are intended.

(8) An improvised substitute for a body belt, or a safety strap, should never be used.

(9) Two safety straps should never be coupled together to reach around a large tree or other object, as this creates a definite hazard. That is, there is liable to be undue strain on the two snap hooks coupled together, produced by a sudden twist on one of the safety straps, causing one of the snap hooks to turn enough to depress the snap-hook keeper, thereby causing a complete disengagement of the two snap-hooks.

(10) When working on a pole, personal safety and comfort are highly dependent upon the adjustment of the safety strap; therefore, be sure the safety strap is properly adjusted to the requirements of each pole worked on.

(11) While ascending and descending a pole, the safety strap should be allowed to hang down, thereby preventing the strap from becoming entangled with the legs.

(12) The safety strap should not be placed around a pole within a foot of the top, nor attached to line wire insulators, crossarms, crossarm braces, vertical braces, pole steps or any fixture which may be loose, badly corroded or decayed.

(13) The safety strap should not be attached to pole line equipment in the process of being rearranged or dismantled, or to anything from which the strap might slip.

(14) Sudden changes in position, or swinging rapidly around a pole in a safety strap is dangerous—it is safer to control all movements on the pole by careful timing.

(15) Prior to slacking off on the safety strap preparatory to changing position, make sure that another man working on the same pole is in the clear.

(16) After shifting to another position on the pole, care should be taken to see that both safety strap snap-hooks are securely fastened in the body belt "D" rings.

(17) Make certain that the safety strap snap-hooks are fastened in such manner that the keeper cannot be opened by being accidently pressed against the pole.

(18) A safety strap should not be used for the purpose of riding a cable suspension strand. It is not only dangerous, but also injurious to the strap.

(19) When ascending or descending a stepped pole wearing a safety strap, take care that the strap does not catch on a pole step.

(20) With the exception of the safety strap, a handline, drop wire, or anything else, should never be attached to the body belt "D" rings.

(21) Avoid attaching metal gadgets, chains or wire hooks to the body belt for the purpose of carrying tools, tape, etc. However, if such device is considered necessary, use leather or rawhide strings with hardwood or fiber keepers.

(22) Avoid weakening safety straps and body belt fastening straps by punching additional buckle tongue holes.

(23) Be sure the body belt fastening strap is not too short, or it will not be long enough when heavy winter clothes are worn.

(24) Body belt and safety straps should not be dropped from poles, run over by a truck, or heavy objects allowed to fall on them.

(25) Care should be taken when traveling to and from jobs to store body belt and safety strap in a designated compartment on the truck to protect them from being damaged by contact with sharp edged tools, caught under heavy line material, or otherwise injured.

(26) Any pole preservatives, paint, grease, or other foreign substances, that may collect on the body belt or safety strap should be removed immediately.

(27) Damp or wet body belt and safety strap should be wiped with a dry clean cloth, and then allowed to completely dry in a well ventilated place.

(28) Keep body belt and safety strap away from fire, gasoline furnace, radiator, stoves, steam pipes, electric heaters, or other places where they may be subjected to excessive heat.

The usefulness of a body belt and safety strap depends a lot on the care taken to keep them clean and in good condition. Fabric body belts and safety straps should be cleaned as recommended by the maker, and then protected with a coating of an approved preservative.

Leather body belts and safety straps may be cleaned with a neutral soap and water. To keep them soft and pliable, treat with neatsfoot oil, and then hang them up for awhile before using again. This lets the oil soak in thoroughly.

Due to wear and tear incident to use, body belts and safety straps should be frequently inspected to make sure they are free from dangerous defects. No defect is too small to be ignored, and the principal items requiring attention are:

(1) *Body Belt:* Look for the condition of the belt material, rivets, stitches, buckle, buckle tongue holes, "D" rings, etc.

(2) *Safety Strap:* Look for (a) Punctures, cracks, nicks, cuts or tears on the edge of the strap; (b) broken or rotted threads in the stitches; (c) strap material worn thin enough to seriously affect the strength of the strap (On fabric straps this is indicated by the color ply. When two outer layers of fabric are worn through, the color ply becomes visible and the strap should be removed from service); (d) loose or broken rivets; (e) snap-hook wear; (f) poor snap-hook keeper action. (The keeper should operate freely without excessive side play, and should close securely under tension of the spring.)

Body belts and safety straps which have developed major defects should have a tag attached to them bearing the inscription, *"dangerous—do not use,"* and also a note on the nature of the defect. After being tagged, a belt or strap, as the case may be, should be withdrawn from service until necessary repairs are made, a new body belt or safety strap is provided, or otherwise disposed of.

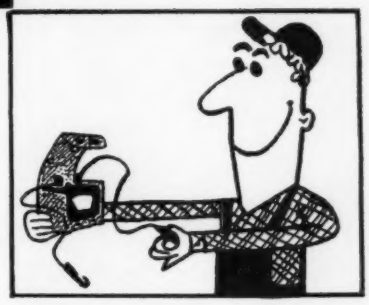
Exercising constant attention to properly caring for body belt and safety straps, insures continued safety when working on telephone poles.

(To Be Continued)

BUSY-BOY

TESTER MODEL E

SIZE:
3¼" x 4" x 4"
Universal Model, for all departments working on telephone circuits.



A **BUSY-BOY** is the only Positive System available today for Monitoring and Working Telephone Circuits, without Interrupting Service.

B **BUSY-BOY** actually saves you DOLLARS in Man-Hours, Equipment, and Time.

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A POSITIVE SYSTEM

JUST AS POSITIVE AS CENTRAL OFFICE BATTERY

OLD SYSTEM	"BUSY BOY" SYSTEM	
NO SECRECY	POSITIVE PRIVACY!	A.
UNAVOIDABLE SERVICE INTERRUPTION	ABSOLUTELY NO SERVICE INTERRUPTION!	
SOME OPERATIONS DOUBTFUL	EVERY TEST POSITIVE!	B.
IT TAKES "TIME" TO HEAR	INSTANTANEOUS!	
FREQUENT BATTERY FAILURE	NO MAINTENANCE!	
DEPENDENT ON OTHER EQUIPMENT	COMPLETELY INDEPENDENT!	
IRKSOME WAITING ON OTHERS	NO WAITING PERIOD!	C.
DISCOMFORT OF HEAD SET	LITTLE NEED FOR HEAD SET!	
LONG TRAINING PERIOD	LITTLE TRAINING NEEDED!	

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ADDRESS: _____

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D. W. Busse of General Telephone Company of Wisconsin, reports

"We installed an Alcoa® Outdoor Booth in the heart of this vacationland late in the spring. At the end of the year, it had produced a total of $2,000 added revenue for us. In fact, we were so pleased with the original installation that we added the second Alcoa Booth late that summer. Even though many of the vacationers had headed for home, it boosted earnings at this location over 20%."

The General Telephone Company services this area with four outdoor aluminum booths. These Alcoa Booths are sturdy as well as attractive. They demand a minimum of attention—stay trouble-free, resist vandalism. Local residents and passing motorists all appreciate their convenience, their 24-hour availability.

"As a result of our excellent experience with these outdoor booths," says Manager Busse, "we plan to install three or four additional booths in this area."

D. W. Busse, General Commercial Manager of the General Telephone Company of Wisconsin, Madison, Wisconsin, standing near the Alcoa Booth installation at Wisconsin Dells. This famous vacation resort area, 55 miles north of Madison, is one of America's greatest scenic attractions. It stretches 12 miles along the Wisconsin River and includes, in addition to its beautiful rock formations, a pioneer village, ghost town, deer park, Winnebago Indian village and other interesting sights.

"LABOR INVOLVED? FOUR HOURS TO INSTALL," reports Mr. Busse. "Each booth comes in subassemblies, separately packaged. Our men just follow the detailed instructions. After assembly, only four hours is required for installation. Parts are interchangeable for easy replacement."

"OUR BUSINESS IS SERVING THE PUBLIC," says Mr. Busse. "We think the Alcoa Goodwill Kit is a perfect helping hand in letting our customers know how we're trying to serve them better." The Goodwill Kit contains ads, publicity releases, TV and radio commercials and bill enclosures printed in two colors on aluminum foil.

"MAINTENANCE? WE JUST WASH THEM," says General Commercial Manager Busse. "Pencil marks or grease smudges wipe right off. We'll never have to spend a cent for painting or rust removal with these Alcoa Booths."

SEND FOR FREE BROCHURE ON ALCOA BOOTHS. Contains complete information. And ask your jobber how Alcoa Outdoor Booths can increase your revenue—build community goodwill. Aluminum Company of America, 1690-C Alcoa Building, Pittsburgh 19, Pennsylvania.

ALCOA ALUMINUM TELEPHONE BOOTHS
ALUMINUM COMPANY OF AMERICA

Your Guide to the Best in Aluminum Value

"ALCOA THEATRE"
Exciting Adventure—Alternate Monday Evenings

Adventure in Microwave Tower Building

By JOHN McCLURE SNOOK*
As Told to Ray Blain

Regular construction crew of Gulf Telephone Co. erect 100-foot microwave tower out of poles. At top of tower are Birnie Taylor (waving hand), James Free, S. B. Stark Jr. and John Benson. Picture shows inside gin pole, temporary work platforms and temporary and permanent guys.

WHEN the Gulf Telephone Co. of Foley, Ala., developed a need for a 100-foot microwave radio tower to furnish trunk service to its Orange Beach exchange, the thought of erecting a structure out of treated yellow pine poles came to the management.

It was recognized that a metal tower would be more attractive and less costly than the wooden structure, considering the time that would be involved in installing the latter. However, the management thought the poles would have a higher resistance to the effects of the heavy salt sea air prevalent in that area; and too, it was intrigued with the idea of performing the more or less "do it yourself" tower construction job.

It was necessary to use the company's own construction force to erect the tower as none of the contractors in the area were interested in undertaking such a difficult task. Safety measures were carefully formulated and observed and no accidents were encountered in the construction of the tower.

About two months' time was required to erect the tower and the total cost was approximately $6,500. The management realizes that the time consumed in the project and the cost were excessive, and that its interesting and challenging "do-it-yourself" experiment would dictate that the installation of metal towers, which can satisfactorily resist heavy salt sea air, should be considered in any future expansion of the company's microwave system.

As has been the Gulf company's policy for many years, civil defense and preparation for an eventual clash of cultures (see TELEPHONY, Sept. 23, 1950, pages 22 and 23; June 30, 1951, pages 17, 18 and 19) has been one of the prime factors of company development. Community assistance and service has also been a foremost consideration. The wooden structure therefore was designed and constructed with the thought in mind of serving as a potential watchtower for air or submarine attack as it commands a splendid view of the Gulf terrace and airways of this area.

The stairs and means of access to mounting the tower were designed so that ordinary civil personnel can climb to the top without undue danger and hardship. The convenient access also makes antenna readjustment and facility maintenance much simpler and more economical.

Presently the tower lighting is used as a range light and land-fall for local

*Mr. Snook is general manager of the Gulf Telephone Co. of Foley, Ala.

fishermen and shipping of the area. Therefore a high degree of light maintenance is required. Since at the time this tower was designed and built it was a pioneer structure of this type, there were no firm offers from any contractors proposing steel towers and in order to get this exchange in this area working and the microwave trunks functioning it was felt necessary to proceed with this structure.

Inasmuch as the construction of the wooden tower was so unique and presented so many unusual problems, not found in ordinary telephone plant construction, plant men will be interested in how the Gulf Telephone Co. forces solved them.

The microwave link between Foley and Orange Beach is exactly 10.5 miles. The wire mileage to cover the same distance would be approximately 18 miles. The antenna for the Foley end of the microwave system is located on a watertower about 50 feet from the exchange building and about 108 feet above ground level.

The main structure of the Orange Beach tower consists of three Alabama yellow pine poles 101 feet in length, weighing about five tons each. The tower itself is so designed as to be self-supporting, but is further reinforced by heavy steel strand guys at the 45 and 95-foot levels. The tower is provided with obstruction lights at three levels.

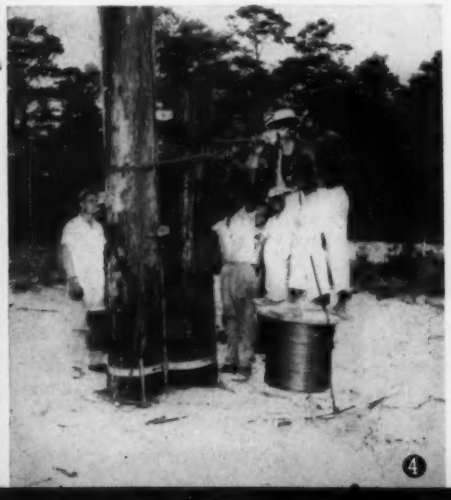
After laying out and staking the general design of the tower, a 60-foot gin pole was erected and guyed to serve as a main hoist structure. Next, three five-ton blocks were chained to the top in such position that the main hoisting truck and the auxiliary trucks would counter balance one another when the load of the five-ton pole was placed on the gin pole.

Heavy dead-man anchors were sunk at designated locations, some 10 feet in the ground to serve as anchors for the guys. The 25-foot heavy footer piles were then placed in the ground. This operation required the sinking of a series of caissons into the swampy, sandy soil. The sand was removed from the caissons by means of a regular earth auger mounted on the "A" frame of the winch truck. The piles were doubly mud-silled and placed in position. The upper caisson material was then removed and the hole filled and tamped. Large 4-inch x 16-inch planks were placed and anchored on the inside of the piles to serve as bearing plates for the 101-foot poles, the butts of which rested on the surface of the ground.

The winch trucks used in hoisting poles for the Gulf company's microwave tower were operated by female employes of the company. Several days before the actual pole hoisting operation, these girls practiced with the equipment. Shown above are Mrs. Betty Ann Barry (left) and Mrs. Aurelia Rogers, lowering the legs of "Leaping Lena," one of the winch trucks used in the operation. The girls enjoyed the work because it gave them an opportunity to get a sun-tan.

The 101-foot poles were then moved by means of winches and rollers placed in proper position for hoisting. This was accomplished by methods similar to those used by the ancient Druids in placing their monolithic stones for hoisting, namely, a series of wooden rollers. The only difference was that power winches were used instead of oxen for motive power. The winch cables used in this hoisting operation were pulled taut and held under strain for a day and a night to remove all

(Please turn to page 47)



1 **View showing the erection of the first of three upright supporting poles for the microwave tower.**

2 **Longitudinal view of hoisting first pole into place. The winch-trucks were used—one as a hoisting truck and the other two as auxiliary and balancing trucks. Shown in the picture are, left to right, S. B. Stark Jr., Willie Woodyard and General Manager John M. Snook (right), directing hoisting operation.**

3 **Bringing upright pole into position. Shown in this picture are, left to right, Birnie Taylor, Herbert Taylor, John Dickerson, and John Benson.**

4 **Drilling butt piling and pole to take large bolt.**

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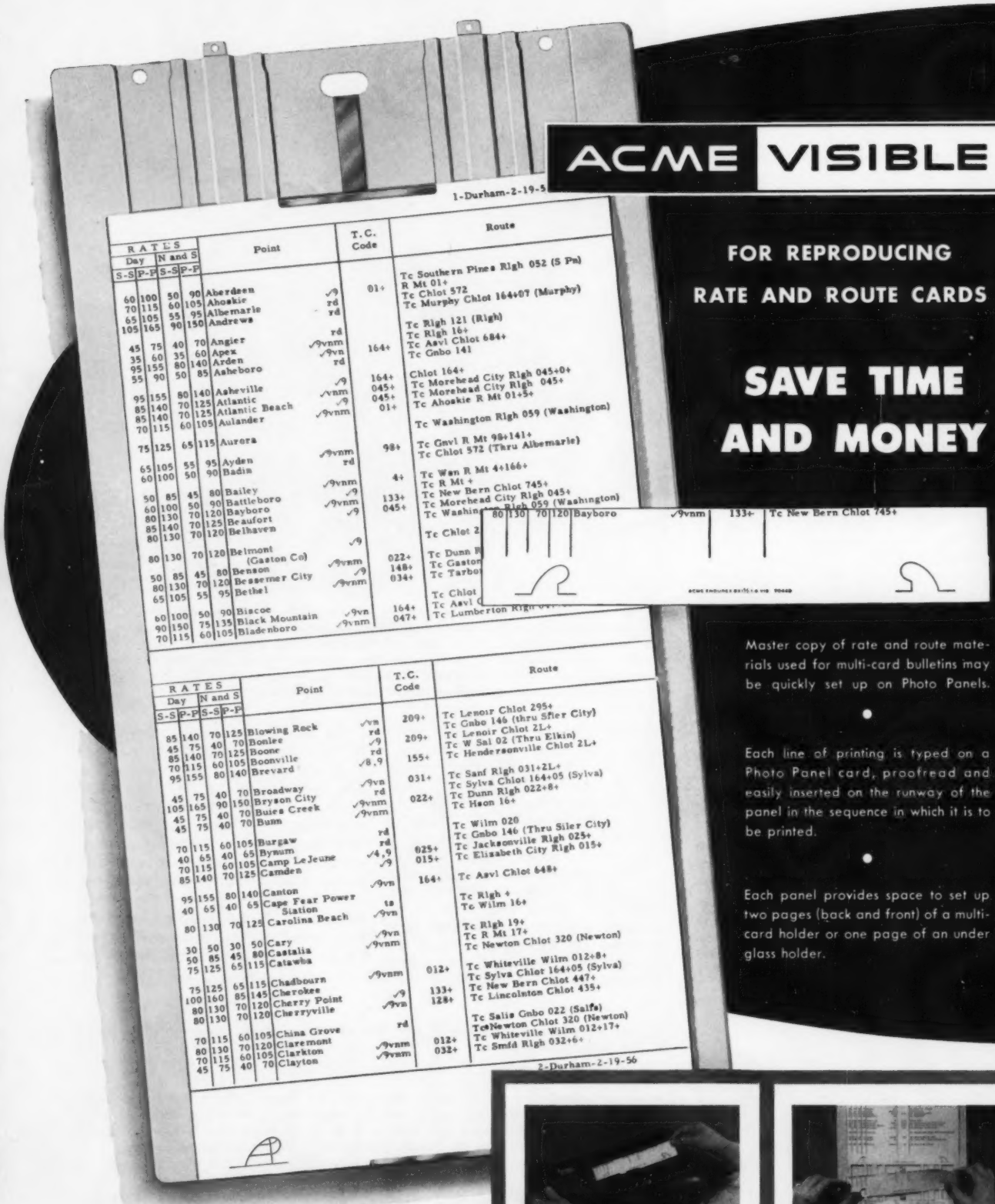
1-Durham-2-19-5
RATES
Day
N and S
S-S P-P S-S P-P
Point
T.C. Code
Route
60 100 50 90 Aberdeen ✓9 01+ Tc Southern Pines Righ 052 (S Pn)
70 115 60 105 Ahoskie rd R Mt 01+
65 105 55 95 Albemarle rd Tc Chlot 572
105 165 90 150 Andrews Tc Murphy Chlot 164+07 (Murphy)
rd Tc Righ 121 (Righ)
45 75 40 70 Angier ✓9vnm Tc Righ 16+
35 60 35 60 Apex ✓9vn 164+ Tc Asvl Chlot 684+
95 155 80 140 Arden rd Tc Gnbo 141
55 90 50 85 Asheboro Chlot 164+
95 155 80 140 Asheville ✓9 164+ Tc Morehead City Righ 045+0+
85 140 70 125 Atlantic ✓vnm 045+ Tc Morehead City Righ 045+
85 140 70 125 Atlantic Beach ✓9 045+ Tc Ahoskie R Mt 01+5+
70 115 60 105 Aulander ✓9vnm 01+
Tc Washington Righ 059 (Washington)
75 125 65 115 Aurora Tc Gnvl R Mt 98+141+
✓9vnm 98+ Tc Chlot 572 (Thru Albemarle)
65 105 55 95 Ayden rd
60 100 50 90 Badin Tc Wsn R Mt 4+166+
✓9vnm 4+ Tc R Mt +
50 85 45 80 Bailey ✓9 Tc New Bern Chlot 745+
60 100 50 90 Battleboro ✓9vnm 133+ Tc Morehead City Righ 045+
80 130 70 120 Bayboro ✓9 045+ Tc Washington Righ 059 (Washington)
85 140 70 125 Beaufort
80 130 70 120 Belhaven Tc Chlot 2
✓9
80 130 70 120 Belmont (Gaston Co) ✓9vnm 022+ Tc Dunn R
50 85 45 80 Benson ✓9 148+ Tc Gaston
80 130 70 120 Bessemer City ✓9vnm 034+ Tc Tarbo
65 105 55 95 Bethel Tc Chlot
60 100 50 90 Biscoe ✓9vn 164+ Tc Asvl
90 150 75 135 Black Mountain ✓9vnm 047+ Tc Lumberton Righ
70 115 60 105 Bladenboro
RATES
Day
N and S
S-S P-P S-S P-P
Point
T.C. Code
Route
85 140 70 125 Blowing Rock ✓vn 209+ Tc Lenoir Chlot 295+
45 75 40 70 Bonlee rd Tc Gnbo 146 (thru Siler City)
85 140 70 125 Boone ✓9 209+ Tc Lenoir Chlot 2L+
70 115 60 105 Boonville rd Tc W Sal 02 (Thru Elkin)
95 155 80 140 Brevard ✓8,9 155+ Tc Hendersonville Chlot 2L+
✓9vn Tc Sanf Righ 031+2L+
45 75 40 70 Broadway rd 031+ Tc Sylva Chlot 164+05 (Sylva)
105 165 90 150 Bryson City ✓9vnm Tc Dunn Righ 022+8+
45 75 40 70 Buies Creek ✓9vnm 022+ Tc Hson 16+
45 75 40 70 Bunn
Tc Wilm 020
rd Tc Gnbo 146 (Thru Siler City)
70 115 60 105 Burgaw rd Tc Jacksonville Righ 025+
40 65 40 65 Bynum ✓4,9 025+ Tc Elizabeth City Righ 015+
70 115 60 105 Camp LeJeune ✓9 015+
85 140 70 125 Camden Tc Asvl Chlot 648+
✓9vn 164+
95 155 80 140 Canton Tc Righ +
40 65 40 65 Cape Fear Power Station te Tc Wilm 16+
✓9vn
80 130 70 125 Carolina Beach ✓9vn Tc Righ 19+
✓9vnm Tc R Mt 17+
30 50 30 50 Cary Tc Newton Chlot 320 (Newton)
50 85 45 80 Castalia
75 125 65 115 Catawba Tc Whiteville Wilm 012+8+
✓9vnm 012+ Tc Sylva Chlot 164+05 (Sylva)
75 125 65 115 Chadbourn Tc New Bern Chlot 447+
100 160 85 145 Cherokee ✓9 133+ Tc Lincolnton Chlot 435+
80 130 70 120 Cherry Point ✓9vn 128+
80 130 70 120 Cherryville Tc Salis Gnbo 022 (Salis)
rd Tc Newton Chlot 320 (Newton)
70 115 60 105 China Grove Tc Whiteville Wilm 012+17+
80 130 70 120 Claremont ✓9vnm 012+ Tc Smld Righ 032+6+
70 115 60 105 Clarkton ✓9vnm 032+
45 75 40 70 Clayton
2-Durham-2-19-56
80 130 70 120 Bayboro ✓9vnm 133+ Tc New Bern Chlot 745+

Master copy of rate and route materials used for multi-card bulletins may be quickly set up on Photo Panels.

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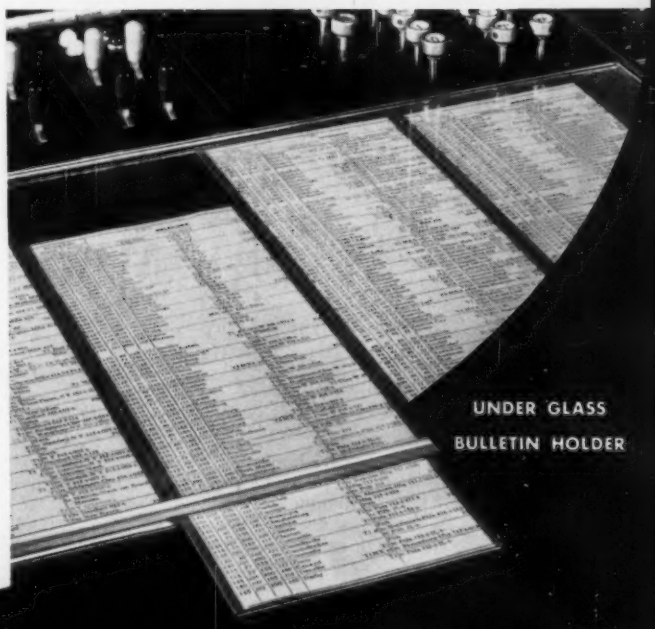

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☐ Have representative call. Date..... Time.....

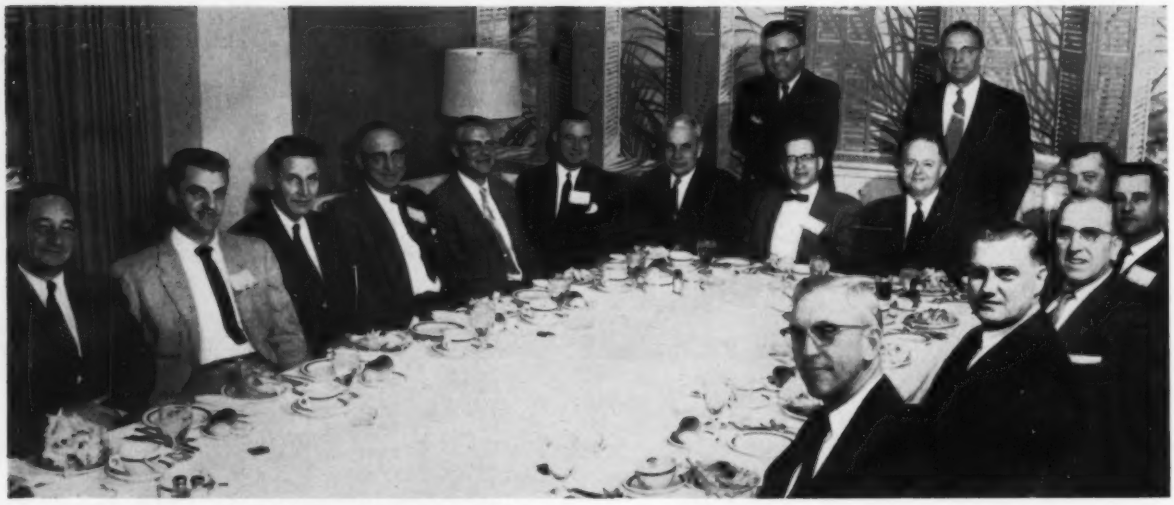
☐ We are interested in Acme Visible equipment for.....records.
KIND OF RECORD

Company.....

Attention.....

Address.....

City..... Zone..... State.....



Officers and directors of Minnesota Telephone Association, Inc., are (from left, seated and reading around the table): Charles R. Cashel of Worthington; Kenneth M. Peterson of Kerkhoven (newly elected); Herbert J. Lien of Blackduck; A. G. Stradtman of St. James (newly elected); John G. Holland, New Ulm; Elnathan C. Gates of Minneapolis; Eldon Eckles of Blue Earth, past president; H. James Boyd of Alexandria, president; Keith W. Vogt of St. Paul, secretary-treasurer; Kenneth P. Ellefson of Ada (newly-elected); C. F. Marvin of Zumbrota; J. F. Eitzen of Mountain Lake; W. L. Stocks Jr. of Minneapolis (newly elected), and Paul Glaeser of Springfield. Standing are (from left): Dell Ludenia of Osakis (newly elected) and Carl M. Ostby of Erskine, vice president.

Broad Industry Program Presented At 49th Minnesota Convention

By Dan S. Fargo

THE MINNESOTA Telephone Association's 49th annual convention drew 769 persons to St. Paul on Feb. 17, 18 and 19 to consider industry matters on a broad scale ranging from federal excise tax repeal and the federal-aid highway relocation problem to service responsibilities and new developments.

H. James Boyd of Alexandria, Association president, presented his message on the inspirational theme of what qualities go far toward making up an excellent service attitude on the part of telephone company management. He said: "If our industry is going to continue to blossom each year and continue to grow, we must be careful that we, who are a part of it, do not become complacent and unready to change our ways as the need requires."

Among the factors to be watched and considered if telephone men are to remain alive and expanding, Mr. Boyd listed:

"*Sincerity*—The state or quality of being pure, genuine, simple and unaffected, frank and honest. . . .

"If, in our dealing with our customers and employes we are not sincere, we, or our companies, will soon be considered as hypocrites, and not to be trusted.

"In an industry such as ours, where by nature of the business there are going to be service outages, party-line conflicts, and an occasional wrong-timed toll ticket, or some other error, we must continually remember to give each complaint sincere, individualistic attention.

"Our customers do not realize that we have heard complaints just like theirs many times before. To them, it is a once-a-year occasion, and important.

"*Vision*—In the sense of understanding and insight, of being able to look ahead.

"We live in a changing world. We must either change with it or be lost.

"To be able to stay with the times and adjust to changing conditions, we have to be constantly watching the trends in other industries and the desires of our customers. All we need do is observe what has happened with color telephones. This is a color era—school rooms, stoves, refrigerators, adding machines, automobiles, all come in a wide variety of colors, and it is just natural that the black telephone had to step back a bit and have company in our customers' homes.

"Many companies are making use of subscriber carrier equipment. We are apt to also find microwave a useful tool of the future. We must be visionary and try to evaluate how these new devices may better our service.

"At the national convention last October, Donald Power, President of the United States Independent Telephone Association, predicted a telephone in every room as a not-too-distant accomplishment, and eventually a telephone for every person. We must all set our sights high if we are going to remain a part of this fast-changing industry."

Other qualities Mr. Boyd mentioned as worth development by telephone men included profiting from experience, a sense of responsibility, initiative, courtesy, and the continuation of one's education.

Mr. Boyd said that, in the telephone industry, education must be a continuing process because equipment, methods and concepts are changing so swiftly. To this end, the Minnesota association for three years has had an education committee. The committee's efforts about a year ago resulted in a one-week cable splicing school in Mankato, and several months ago in a two-day carrier school, for which 51 registered. Mr. Boyd said the education committee has additional ideas for schools and would welcome other ideas from association members.

Also stressed in Mr. Boyd's report was the need for companies to redouble efforts to acquaint their subscribers with the state law regarding emergency telephone calls on party lines. Mr. Boyd suggested that post card mailings to subscribers, newspaper or radio ads, and bill inserts be used to supplement the present message about the law carried in telephone directories in the state.

Fred H. Strong, deputy administrator of the Rural Electrification Administration, in expanding his subject, "Let's Keep Talk Cheap," pointed out that the cheapness or costliness of telephone service is not to be based solely on dollar cost.

For example, he said, a farmer may make an urgent call to his Congressman. Or he may check the market for hogs by telephone. If he can get one cent a pound more for his hogs, his talk has been cheap.

Another instance of keeping talk cheap, Mr. Strong said, is the instituting of new cost-cutting methods by REA, such as:

Standard construction specifications.
Simplification of job estimating.
Standardization of central office equipment.
Requirement of competitive bidding.

Talking over convention activities is this group at the Minnesota convention gathering in St. Paul. From left: J. F. Eitzen of Mountain Lake; Bernard Knuth of Woodstock; Mrs. Knuth; Mrs. Kenneth Ellefson of Ada; Mr. Ellefson, and Harold Bollinger of Waconia.

According to the deputy administrator, 64 loans have been made by REA in Minnesota to 33 borrowers for a total of 24 million dollars. At present 71 per cent of farms have telephone service, but not all have dial service, so a big job remains, he said.

Many new developments in the telephone field also will help to lower the "cost of talk," Mr. Strong stated. These include:

Improved chemical brush control.
Lower cost plastic-jacketed cable.
Color-coded cable.
New concepts in insulated wire plant.
Results of a microwave test in Wisconsin.
Subscriber carrier equipment.
Buried plant.
Dial mobile radio units.

A testimonial luncheon was given on Feb. 17 for A. N. Francher, retiring on Apr. 1 as supervisor of the telephone division for the Minnesota Railroad & Warehouse Commission.

Hjalmar Petersen, vice chairman of the commission, saluted Francher's 29-year service record with the state and his 58-year association with the telephone industry both in his commission post and in various positions he held with individual telephone companies prior to 1929.

Charles M. Hanna, Chicago, philosopher-humorist, was principal speaker at the luncheon.

Keith W. Vogt, secretary-treasurer, reported that 252 Minnesota Independents plus Northwestern Bell Telephone Co. now operate 1,022,000 dial telephones in Minnesota. This is a gain of 26,252 dial instruments in the year ended Dec. 31, 1957. Independents converted 32 exchanges to automatic operation and Northwestern Bell three during 1957. In addition, five new automatic exchanges were established to serve 834 subscribers who previously had no telephone service.

Mr. Vogt reviewed the status of enabling legislation to provide reimbursement to utilities for relocation costs in the federal highway program, and stated:

(Please turn to page 38)

Head-table guests at the A. N. Fancher testimonial luncheon during the Minnesota telephone convention included (from left): H. James Boyd of Alexandria, association president; Eldon Eckles of Blue Earth, past president; Mrs. Eckles; Mrs. Boyd; Jay Houghtaling of Minneapolis and Mr. Fancher.

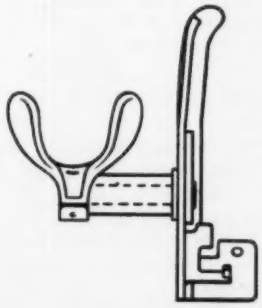
4 REASONS WHY AUTOMATIC'S WALL TELEPHONE IS YOUR BEST BUY...

1. No "off-hook" complaints!

Our "wrap-around" cradle holds the handset secure—it's almost impossible to knock it off the hook. Yet the handset is easy to remove intentionally. And because the handset is side-mounted, Automatic's Type 90 Wall Telephone fits snugly to the wall.

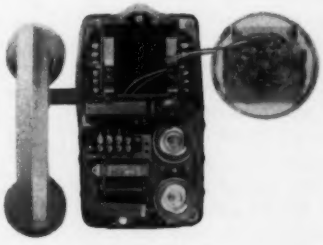
2. No costly broken hooks!

Type 90's metal cradle bracket is so strong we had a youngster chin himself on it. The cradle is a rugged die-cast metal and the hookswitch lever is inside a protective die-cast tube.



3. Installation is a snap—and maintenance, too!

Loosen one screw, the cover lifts off and you fasten Type 90 to the wall (handset stays in the cradle.) The loop compensator is adjusted from the front. With a screwdriver you can connect the line wires to the terminal strip. To remove the dial from its mounting, just push and lift. And note this: you can remove the ringer from the front—without taking the phone off the wall.



4. Dialing is easier—standing or sitting!

Whether you stand or sit, Type 90's special dial angle provides easier readability—makes full use of available light as well. This convenient dial angle plus the big, modern figures and guiding arrowheads assure faster, surer dialing.

10 SPARKLING COLORS TO OFFER YOUR CUSTOMERS!

Automatic's Type 90 Wall Telephone comes in a wide selection of colors to help you really cash in on extension phone sales. Your customers can choose from Classic Ivory, Sunlight Yellow, Turquoise, Dawn Gray, Sand Beige, Jade Green, Garnet Red, Gardenia White, Camellia Pink, and Forget-me-not Blue.

Don't forget, too, that the Type 90 has lifelike transmission and improved ringing—just like our popular Type 80 Telephone. What it all adds up to is this: more and more telephone companies are ordering Type 90 Wall Telephones. How about you? To order, just write: *Automatic Electric Sales Corporation, Northlake, Illinois. Or call Fillmore 5-7111.*

AUTOMATIC ELECTRIC

A member of the General Telephone System—One of America's great communications systems

GENERAL SYSTEM

The A. N. Fancher testimonial luncheon drew, among others, these guests at the head table (from left): Keith W. Vogt of St. Paul, Minnesota, association secretary-treasurer; Charles R. Cashel of Worthington; Clive W. Haas of Big Timber, Mont., United States Independent Telephone Association president; Fred Strong of Washington, D. C., deputy REA administrator; Commissioner Paul Rasmussen of the Minnesota Railroad & Warehouse Commission; Elnathan Gates of Minneapolis, and Commissioner Hjalmer Petersen of the Minnesota commission.

"The attack against us goes on at both the state and federal level."

"The 1957 Minnesota legislature authorized full reimbursement to the utilities on relocation costs along 938 miles of interstate highways, but did not authorize reimbursement on the 12,000 miles of intrastate highways. Even now an attempt is being made to declare that enabling legislation unconstitutional."

Mr. Vogt said he had pointed out at legislative hearings that telephone companies are not allowed by law to build up reserves to take care of highway relocation facility removal; thus they could face bankruptcy if they have to bear the whole cost of highway relocation.

Mr. Vogt called for support of the industry-at-large's effort to rid itself of excise taxes on telephone service.

"Heads Up! You're Living in a Great State" was both the subject and the tenor of a talk by Thomas H. Swain, executive director of the Minnesota Centennial Commission. Mr. Swain observed that Minnesotans have failed to communicate pride in their state, and instead have been sheepish about the severity of the state's winter weather. He urged more emphasis on Minnesota's enviably low 1 per cent selective service rejection rate or on the fact that people in the state have the second highest life expectancy in the United States.

A series of slides and commentary on "Our Corner of the Universe" were presented by L. E. Armfield, president, Communication Consultants, Inc., Fargo, N. D. During the course of an extensively informative talk about the solar system and the universe, Mr. Armfield stated that this year and part of next, telephone companies could expect disturbance of communications due to the sun's influence.

Clive W. Haas, Big Timber, Mont., president of the United States Independent Telephone Association, discussed "The Forward Look in USITA." He said, "Within the next 10 years some use of radio transmission will be required of all Independents. . . . That is why USITA has been so carefully guarding the industry interest to see that it gets its share of the radio spectrum." Mr. Haas recommended studying the trade magazines for articles and news on telephone industry use of radio; also consultation with the manufacturers of radio equipment.

Mr. Haas told of the fight necessary to preserve the utility reimbursement provision for federal-aid highway relocation of facilities. He said the alternatives to retaining this reimbursement provision are high rates for service in those companies affected, or in some cases financial embarrassment or even bankruptcy. He suggested the following action:

Volunteer support to the USITA's Highway Relocation Costs Committee, whose chairman is Hugh A. Barnhart, Rochester, Ind.

Bring the financial hardship aspects to the attention of municipalities.

Reactivate state committees once formed to secure passage of the provision.

In an effort to keep state associations and USITA members aware of the progress of negotiations between the USITA Toll Compensation Committee and the Bell System, the national association plans to issue a bulletin on this matter periodically, he stated.

Mr. Haas reported that the USITA Personnel Committee plans to formulate a correspondence course in management development.

He issued an appeal for those Independents who are not members of USITA to join so that the national association might capitalize on the added influence new members would afford as well as the financial undergirding.

Mr. Haas also reported that the line can't be held much longer on the 750-station operator exemption under the Wage-Hour Law, so that dial service is practically a must.

W. L. Stocks Jr., of Minneapolis, general commercial manager of Northwestern Bell Telephone Co., in his talk, "A Look Ahead," observed: "We must serve well if we are to prosper, but we must prosper if we are to serve well." Then he posed the question: "Are we as prosperous as we need to be." He continued:

"Notice, please, that I said *need* to be. Not what we might want to be. nor what some segments of the public think we should be. But *need to be* in the sense that we must be prosperous if we are to serve well.

"Is there any valid reason the telephone business must necessarily be considered as a low-earning industry? Telephone service has been a low-earning enterprise for a long time. It ought not be.

"Placing emphasis on the lowest possible earnings on which a company can survive, rather than on the more sensible basis of reasonable earnings to produce good service, is very much like a farmer buying a mule mainly on how little the mule could live on, rather than on how much work he could do if properly fed.

"A large segment of the public seems to think that low earnings mean low rates and good earnings mean high rates. Actually, telephone people know

(Please turn to page 47)

Average-reading wattmeters, bi-directional power monitors

Sierra 185A-15FN Wattmeter

Terminate rf coax systems

Measure rf powers

Measure incident, reflected powers

Match antennas, loads

Sierra 164 Power Monitor

New convenience, simplicity, for terminating rf coaxial systems and measuring average rf powers is available with Sierra 185A series Average-Reading Termination Wattmeters. Frequency range 20 MC to 1,000 MC, accuracy of ±5%, and VSWR 1.2 maximum. Three instruments cover, respectively, following power ranges and maximum dissipations: 0 to 5/15 watts, 15 watts; 0 to 30/100 watts, 100 watts; 0 to 150/500 watts, 500 watts. Conservatively rated, negligible rf leakage, ideal loads for CW, AM and FM transmitter and oscillator tests.

New convenience, simplicity for intermittent or continuous measurement of incident or reflected power is available with Sierra 164 series Power Monitors. Direct reading, accurate within ±5%, high directivity, low VSWR. Four plug-ins offer 1, 5, 10 and 50 watts full scale, 25 MC to 1,000 MC. Two additional plug-ins offer 10, 50, 100 and 500 watts full scale. A further plug-in covers 10 MC to 75 MC, 50, 100, 500, 1,000 watts full scale. No auxiliary power needed; power flow direction reversed by control knob at top of plug-in.

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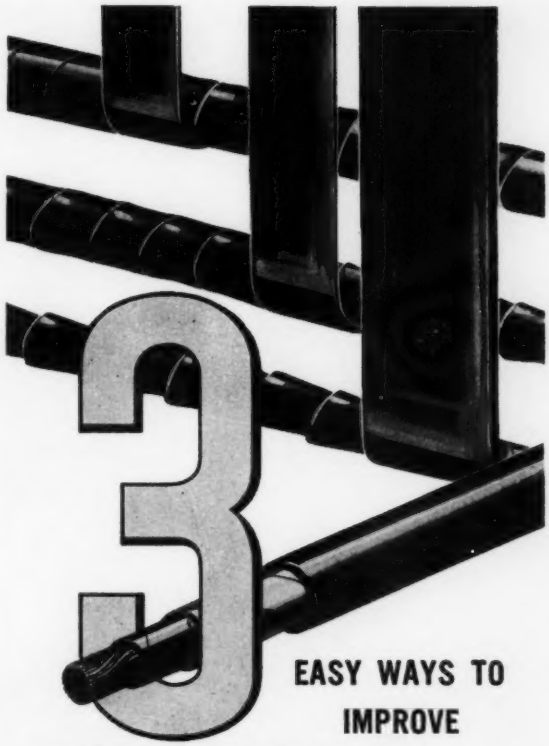

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3. **TOUGH, ABRASION-RESISTANT COVERING... BISHOP Vinyl Electrical Tapes.** Thin, (.007 and .010), tough, pressure-sensitive tapes, highly resistant to sun, water, oil, acids, alkalies and corrosive chemicals.

BISHOP'S Tape Trio accepted by REA as per REA Standard PC-2 and PC-3

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Courts and Commissions

Ask Increase, Stock OK For 2 New York Companies

The New York Public Service Commission is scheduled to hold a hearing on Apr. 2 on the petition of the Rochester Telephone Corp. for an increase in rates.

The proposed rates would provide the company with additional annual revenues totaling $2,100,000, or approximately 10 per cent more than the company's present rates produce.

In seeking the increase, the company reported to the commission that since 1954 its annual operating costs have increased by an estimated $2,250,000. Of this amount, $1,550,000 went for wage increases and $700,000 was spent on higher taxes.

The company also told the commission that during the three-year period from 1955 through 1957, it had spent 31 million dollars for plant improvements. This was in addition to the 39 million dollars spent for such purposes from 1946 through 1954. Construction planned for the five years ending in 1962 will cost an additional 54 million dollars, the company stated.

In its petition, the company proposed to increase its rates as of Apr. 1.

•

The New York Public Service Commission on Mar. 10 authorized the Marathon Killawog Telephone Co., Inc., Marathon, to change its name to Western Counties Telephone Corp. The company was also authorized to increase its no par value common stock from 1,000 to 2,500 shares.

The company said the proposals approved on Mar. 10 were made in anticipation of its proposed purchase of the Darien Telephone Co., Corfu.

Request Increase, Purchase Approvals In Wisconsin

Three companies have filed applications for rate increases with the Wisconsin Public Service Commission.

Hearing dates were Mar. 17 for the application of the Pine River Telephone Co., and Mar. 20 for the Almena Farmers Telephone Co., and the Spring Valley Telephone companies' requests.

On Mar. 21 the commission was scheduled to hear the application of the Nelson Telephone Cooperative for authority to purchase the Arkansaw Telephone Co.

Neb. Company Gets Raise OK For 2 Exchanges

A general rate increase for its Creighton and Niobrara exchanges effective on Apr. 1 was granted to the Northern Telephone Co., Blair, on February 25 by the Nebraska Railway Commission (TELEPHONY, Mar. 8, p. 34).

The following increases were allowed:

Creighton	*Old Rate*	*New Rate*
One-party business (C.B.)	$6.00	$7.00
Two-party business (C.B.)	4.75	6.50
One-party residence (C.B.)	3.75	4.00
Two-party residence (C.B.)	3.25	3.50
Four-party residence (C.B.)	2.75	3.00
Rural business (Mag.)	4.00	4.25
Rural residence-metallic (Mag.)	2.75	3.00
Niobrara (Metallic)		
One-party business	$4.50	$5.50
Two-party business		5.00
One-party residence	3.00	3.25
Two-party residence	2.50	2.75
Four-party residence	2.25	2.50

The new rates will produce about $3,624 in additional gross revenue. Total annual operating revenue is estimated at $50,696 and expenses at $38,933 exclusive of $4,937 in taxes and $385 in miscellaneous charges. The rate of return will be 5.89 per cent on a net book rate base of $109,398.

Kansas Independent Asks OK to Buy Exchange

The Kansas Corporation Commission on Feb. 25 held a hearing on a petition by the South Central Telephone Association, Inc., Medicine Lodge, to buy the Hazelton Telephone Exchange.

The South Central company has been operating the exchange on a rental basis since the death of Hazelton's owner, Howard Hoffman, in September 1956.

Utah Company Seeks Rate Increase OK

A hearing was scheduled for Mar. 18 by the Utah Public Service Commission on the application to increase rates of the Midland Telephone Co., Moab.

The Midland company proposes the following changes in monthly rates:

	Old	*New*
One-party business	$4.50	$7.00
Two-party business	3.50	4.50
Multi-party rural business	4.50	6.00*
One-party residence	3.50	5.00
Rural multi-party residence	2.50	3.40*

*Plus 40 cents per mile for each 3 miles beyond the first 6 miles from the nearest exchange.

Issue Guide to Subscriber Classification in Missouri

The Missouri Public Service Commission has compiled a guide to the proper classification of business and residence telephones. The Missouri Telephone Association published this guide in its Mar. 12 newsletter. Classifications set by the commission are:

A. Business rates apply at the following locations:

(1) In offices, stores, factories, and all other places of a strictly business nature.

(2) In boarding houses, except as noted under B-2, offices of hotels, halls, and offices of apartment buildings, quarters occupied by clubs or lodges, public, private, or parochial schools or colleges, hospitals, libraries, churches, and other similar institutions.

(3) At residence locations when the subscriber has no regular business telephone and the use of the service either by himself, members of his household, or his guests, or parties calling him can be considered as more of a business than of a residence nature, which fact might be indicated by advertising, either by business cards, newspapers, handbills, billboards, circulars, motion picture screens, or other advertising matter, such as on vehicles, etc., or when such business use is not such as commonly arises and passes over to residence telephone during the intervals when, in compliance with the law or established custom, business places are ordinarily closed.

(4) Where the place of business and

the residence of a subscriber are on the same premises and no telephone is installed in the place of business, the business rate shall be charged for the telephone installed in the residence.

(5) At residence locations, when an extension station or extension bell is located in a shop, office, or other place of business.

(6) In college fraternity houses.

(7) In any location where the listing of service at that location indicates a business, trade or profession, except as specified under B-3 below.

B. Residence rates apply at the following locations:

(1) In private residences where business listings are not provided.

(2) In private apartments or hotels, rooming houses, or boarding houses where service is confined to the subscriber's use, and elsewhere in rooming and boarding houses which are not advertised as a place of business or which have less than five rooms for roomers or which furnish meals to less than ten boarders, provided business listings are not furnished.

(3) In the place of residence of a clergyman or nurse, and in the place of residence of a physician, dentist, veterinary, surgeon or other medical practitioner, provided the subscriber does not maintain an office in the residence.

More Hearings Set on New Jersey Bell Raise

Additional hearings ordered by the appellate division of the superior court on increased telephone rates for the New Jersey Bell Telephone Co. have been set for Apr. 7 by the New Jersey Public Utilities Commission (TELEPHONY, Mar. 1, p. 44).

The court remanded the case to the commission but refused to grant an interim stay of the 11½-million-dollar increases as requested by a group of petitioners.

Transfer Ownership of Two New York Independents

The New York Public Service Commission on Mar. 12 authorized Morris E. Stiles doing business as the Williamstown Telephone Co., to transfer ownership of that firm to Williamstown Telephone Co., Inc.

In exchange for the plant, Mr. Stiles is to receive a certain number of shares of $100 par value 5 per cent preferred stock in the new corporation. The new corporation will also issue 50 shares of common stock which will be sold to H. G. Ceratt, Inc. The Ceratt company operates primarily as a telephone plant construction and maintenance contractor.

On Mar. 14, the commission authorized Herbert O. Lewis and Dorothy S. Lewis, doing business as the Crown Point Telephone Co. to transfer their operating plant and equipment to the Crown Point Telephone Corp. The corporation will issue a certain number of shares of $100 par value common stock to the Lewises in payment for the property.

General of SW Gets Raises For 4 Texas Exchanges

The following rate increases became effective in Texas exchanges of General Telephone Co. of the Southwest during February.

Exchange	*Old Rate*	*New Rate*
Gregory		
Automatic		
Feb. 1		
460 stations		
One-party business	$7.50	$9.00
Two-party business	6.00	7.50
One-party residence	4.25	4.75
Two-party residence	3.50	4.00
Four-party residence	—	3.50
New Summerfield		
Automatic		
Feb. 1		
79 stations		
One-party business	8.00	9.00
Two-party business	6.50	7.50
One-party residence	4.50	5.00
Two-party residence	3.75	4.25
Four-party residence	3.25	3.75
Gustine		
Magneto		
Feb. 21		
109 stations		
One-party business	2.50	5.50
One-party residence	1.50	3.50
Four-party residence	1.25	3.00
Bishop		
Conversion to Automatic		
Feb. 16		
1,194 stations		
One-party business	9.00	11.00
Two-party business	7.00	8.00
One-party residence	4.50	5.50
Two-party residence	3.75	4.75
Four-party residence	—	4.00

Eight Companies Request OK To Pass on Ore. Local Taxes

Six Independents recently petitioned the Oregon Public Utility Commissioner for approval of a revised tariff covering the billing of subscribers within the boundaries of cities which impose taxes on these companies.

The companies are: Aurora Mutual Telephone Co., Ltd., Eastern Oregon Telephone Co., Pilot Rock; Oregon Telephone Corp., Mt. Vernon; Mt. Hood Telephone Co., Dufur; Estacada Telephone & Telegraph Co. and Valley Telephone Co., Silverton.

The municipal taxes in question include franchise, business, excise or use-of-street taxes. The companies seek to add the following revised section to their tariffs:

"When any municipal corporation or other local taxing agency imposes on the company any franchise, occupation, business, sales, license, excise or privilege tax or exaction, the amount thereof will be billed pro rata to customers receiving service within the boundaries of such municipal corporation or taxing agency by separately stating and adding to the regular billing to the customer."

Having found that sufficient cause existed to investigate the propriety and reasonableness of the above provision's adoption, the commissioner suspended it for a period not to exceed six months from the date given for each company as follows:

Aurora Mutual Telephone Co., Ltd., Mar. 4; Eastern Oregon Telephone Co., Mar. 3; Oregon Telephone Corp., Mar. 7; Mt. Hood Telephone Co., Mar. 11; Estacada Telephone & Telegraph Co., Mar. 6; Valley Telephone Co., Mar. 5.

Two other companies — Columbia Utilities Co., Medford, and Oregon-Washington Telephone Co., Hood River —are seeking to adopt the following provision in their tariffs:

"The exchange and interexchange rate schedules of the company do not include any portion of county and or municipal franchise, license, business, occupation, excise or other revenue taxes applicable to telephone and other service.

"All such taxes where now imposed or which may hereafter be imposed (except real and personal property taxes as now administered by the State Tax Commission of the State of Oregon, and franchise taxes imposed against franchises granted prior to Feb. 15, 1958), may be added by the company to its charges for services, pro rata to customers receiving service within the boundaries of such county and or municipal corporation, or taxing agency, by separately stating and adding to the regular billing to the customer."

The commissioner suspended the provision for investigation for six months from Mar. 3 for the Oregon-Washington Telephone Co., and six months from Mar. 10 for the Columbia Utilities Co.

Increase for Oregon Co. to Produce 4.46% Return

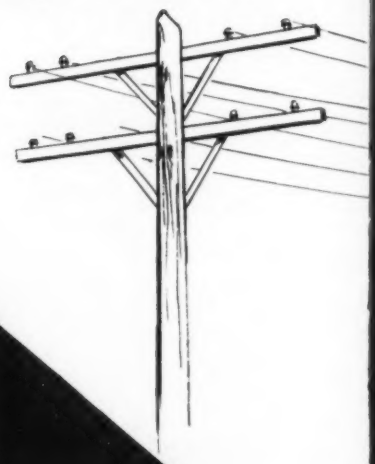
The Fossil Telephone Exchange on Mar. 11 secured approval from the Oregon Public Utility Commissioner to increase rates by approximately $8,850.

The new rates will produce an estimated $6,750.48 in net operating income, which is a 4.46 per cent return on what the commissioner established as the rate base covering a 12-month test period, or $151,528.47.

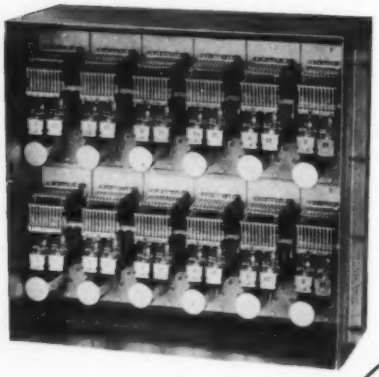
For the 12 months ending Sept. 30, 1957, the company's operating revenues on a pro forma basis were $25,035.86; for the same period, a deficit of $2,272.02 was experienced.

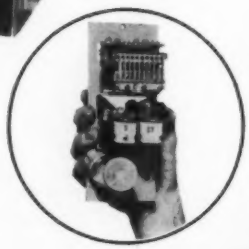
The company provides dial service to a total of 400 stations from its two exchanges.

For *Modern* Party Line Operation →



Typical relay case
for Ringing Converter





Relative size of
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Ringing Converter

The UNIVERSAL
Code-to-Selective Ringing
Converter employs
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magnetic impulse counter,
together with other
standard relay apparatus
of recognized
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Other UNIVERSAL Telephone Equipment:
UNIVERSAL COMPUTER INTERCEPT
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INDEPENDENT

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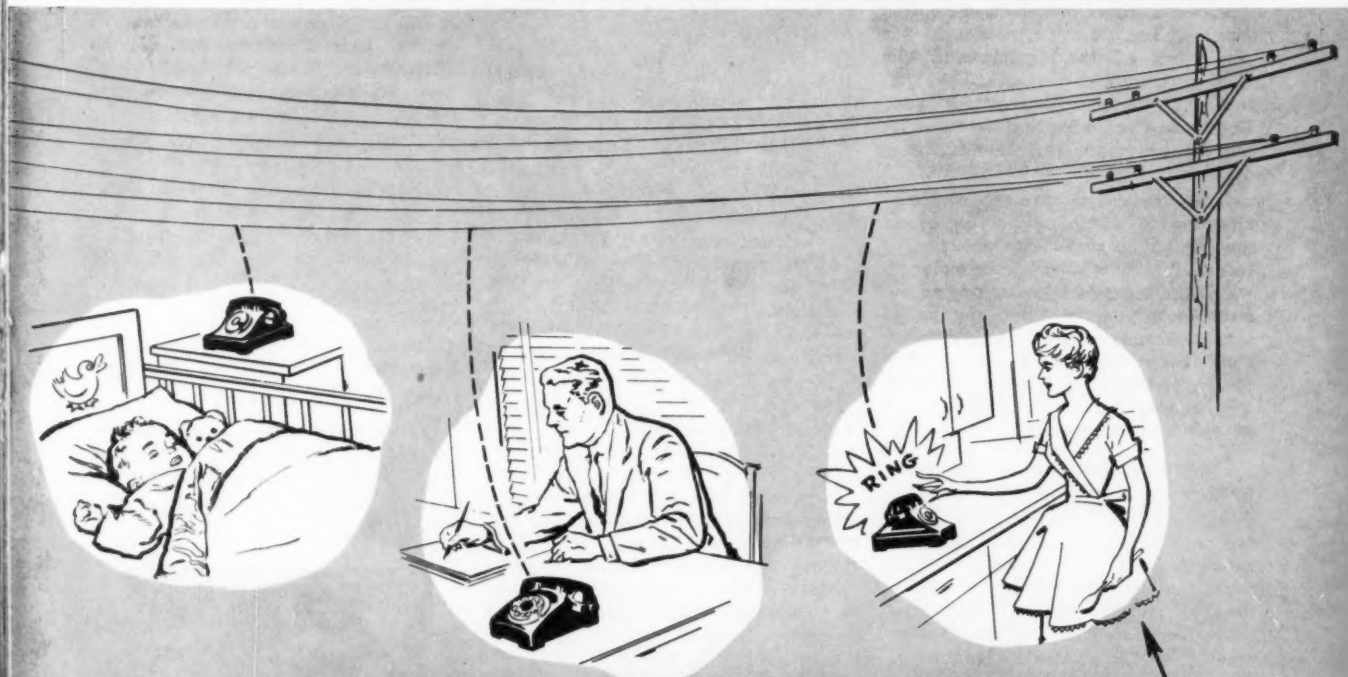

MODERN SERVICE DEMANDS SELECTIVE RINGING

Selective ringing has become a "must" to maintain customer relations, but the cost of modification of earlier dial units to full selective ringing is often excessive . . . in material, engineering and especially for the installation. The UNIVERSAL Code-to-Selective Ringing Converter unit is a simple applique circuit which places the majority of the wiring modification on a factory basis, thus reducing the installation time to a minimum. Most installations can be performed by maintenance personnel. Your company will benefit from increased revenue that can be expected with selective ringing because of increased station rates and increased party line fill.

*Pat. Pend.

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Firm_____

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T-3-22

IN THE NATION'S CAPITAL

Concluded from page 18

along this line." According to an Associated Press dispatch, date line Monroe, La., Mar. 4, Commissioner McKeithen of the Louisiana Public Service Commission said: "The next logical step is contempt proceedings." But he was referring to differences between the company and the commission over expansion of plant facilities.

Sometimes courts have used contempt citations to discipline parties or in making public statements about cases before the court under circumstances which the court feels amount to an obstruction of justice. But any public service commission that would directly seek to bar a utility company from placing advertising because the commission objected to the content, would provide a unique precedent.

Two Appointments of Interest

The telephone industry will be interested in two appointments made during the past fortnight to federal agencies which deal with the industry. One of these was the appointment of a new member to the Federal Communications Commission to fill the vacancy created by the sudden resignation of Richard A. Mack. Mack's successor will be John S. Cross, a former Naval Captain, and, until recently, assistant chief of the State Department's telecommunications division.

Cross was nominated by President Eisenhower and must be confirmed by the Senate. But, because of his career background, broad experience in the communications field, and strategical geographic advantage, his confirmation is to be expected in due course. By strategical geographic advantage is meant that he is a Democrat and comes from Arkansas.

Former Commissioner Mack was a Florida Democrat and under the bipartisan Federal Communications Act, the vacancy would have to be filled by a Democrat or, at least, a non-Republican. Cross also has the powerful sponsorship of the entire Arkansas delegation in Congress. Since the head of the Arkansas delegation in the House is Representative Harris, who was mainly instrumental in ousting Mack from the FCC, the White House selection of Cross was seen as an effort to put a little oil on the raging waters of the controversy stirred up by the investigation of Mack by the House Sub-committee on Legislative Oversight, (of which Representative Harris is chairman).

This is not to infer that Captain Cross was rushed in as an appeasement type of appointment. On the contrary, Captain Cross was among several very highly qualified candidates for the membership on the FCC, which was given to former Commissioner Mack. Cross had the support of his Arkansas congressmen at that time, and he still has it.

The new appointee was born in Birmingham, Ala., in 1904 and graduated from the Alabama Polytechnic Institute with a Bachelor of Science degree in electrical engineering in 1923. He entered government service as a survey chief for the Michigan Highway Department. From 1932 to 1941, he was an engineer with the National Park Service in the Interior Department.

During World War II, Cross served as a captain in the Navy and since the war he has taken care of radio and allied technical matters for the telecommunications division of the State Department. In 1949, in that capacity, Captain Cross was chairman of the U. S. delegation at a conference in Geneva on Standard Loran, a radio navigation system. He claims Arkansas as his residence because he lived there during his National Park Service years before coming to Washington, D. C., to work for the State Department.

Representative Harris spoke very highly of Captain Cross, calling him a "good man" and complimenting President Eisenhower for his "good judgment." Harris recalled that he and other members of the Arkansas delegation had recommended Cross for the FCC post three years ago. If confirmed, Captain Cross will serve through the unexpired portion of Mack's seven-year term, which would have terminated July 1, 1962.

The other appointment in Washington of interest to telephone people was the naming of a new assistant administrator to be placed in charge of the Rural Electrification Administration's rural telephone program. The new chief of the REA rural telephone loan activities will be William S. Rummens, who has been associated for the past year with Boeing Airplane Co.

Mr. Rummens, whose appointment comes from the Secretary of Agriculture and does not need Senate confirmation, succeeds the well-known and highly regarded J. K. (Jack) O'Shaughnessy, who retired from government service last September. Rummens started out in the telephone business as a plant department engineer for the Pacific Telephone & Telegraph Co. at Olympia, Wash., in 1935. He remained with that Bell organization until 1948, except for a tour of duty with the U. S. Navy during World War II.

During his navy duty he was electrical officer on the U.S.S. Hornet when that aircraft carrier was sunk in the Battle of Santa Cruz. Later, Mr. Rummens was assistant maintenance officer on the staff of Admiral William F. (Bull) Halsey, commander of the South Pacific Theater of Naval Operations. He was awarded 13 battle stars for sea duty in the South Pacific.

Rummens is a native of Seattle, where he was born in 1908, and he attended the University of Washington. His career included service on the staff of the Washington Public Service Commission, where he was senior telephone engineer for nine years beginning in 1948.

General of Michigan Names New Traffic Manager

Robert Coffman has been appointed general traffic manager of the General Telephone Co. of Michigan, it was announced recently by T. A. Saunders, president.

ROBERT COFFMAN

Prior to the Michigan assignment, Mr. Coffman held the same post with General Telephone Co. of Ohio. He fills the job held by the late Fred Lickteig.

Mr. Coffman joined the General Telephone organization in 1946 after serving with the Air Transport Command. In his new assignment, he will be located in the company general offices in Muskegon.

Ind. Company Seeks Raise

The Eastern Indiana Telephone Co., Winchester, on Feb. 26 filed an application with the Indiana Public Service Commission for a rate increase.

ADVENTURE IN TOWER BUILDING

Concluded from page 31

stretch before using them for the actual lift.

The poles were marked and drilled on the ground so that it was not necessary to perform this operation in the air. Temporary guys of the best steel strand were attached to the top of the poles. The winch trucks were then positioned and anchored, the hoisting cables arranged and run through the previously provided blocks on the gin pole. A test run was then made of about 20 feet in which the pole was raised and then lowered. This was done to make certain that should some fault develop in the hoisting equipment, the pole could be lowered safely.

Another novel feature of this unusual project is the fact that the winch trucks were operated by girls employed by the Gulf Telephone Co. These girls, prior to the actual pole hoisting operation, had been practicing their coordination for several days by sticking a truck in the deep mud and then winching it out in unison with the three winches to be used.

The hoisting operation of the 101-foot poles was completed without incident. When hoisted to the proper height, the butt of the long pole was placed against the piling to which it was to be lashed, then chained, clamped and drilled. The poles were so well balanced by placing the hoisting sling in the proper location that one man could easily position them from either end.

The only incidence of trouble where a near-accident occurred was on the first pole to be erected. This was when James Free, of the construction crew, volunteered to climb the pole and release the hoisting chain and cable. The pole was so large that he experienced difficulty in obtaining a proper hold for climbing or getting his safety belt around it. Had he not been an expert lineman, and one of iron nerves, an accident could have occurred at this point. However, he managed to carry out his mission with safety. To prevent further incidents of this nature the remaining poles were pulled up against the stepped gin pole, the hoisting cable removed, and the pole pulled into position by the temporary guys attached at the top.

Construction of the super-structure was then started, and tier by tier the bracing was pushed skyward. The timbers were all measured, marked, cut and drilled on the ground and then hoisted into position. Two of the top rigging blocks were used to hoist and secure a large beam to which the hoisting block and hoisting winch rope were attached. Permanent platforms were built at the 45, 85 and 97-foot levels. Beams were placed and bolted to the tops of the tower supports facing Foley and a frame was constructed to accommodate an 8-foot dish antenna.

The completed tower is supplied with power and telephone units for testing. The lightning grounds are tied in with the system grounds, the water system, and a plate at the bottom of each of the 25-foot pilings.

Ordinary checking and maintenance must be maintained on the tower, such as replacing of beacon lights, checking of guy tautness, and alignment tests of the antenna. Any troubleman or woman of the organization may, with ease, climb to the antenna and adjust or service it with little physical effort or danger.

A coaxial cable extends from the receiving-transmitting antenna at the apex of the tower to the radio equipment within the building of the Orange Beach central office building, a distance of about 200 feet. An interesting phenomenon was discovered during the first season of operation of the microwave system. The wave length seems to be the same as that of the wasps of the area, as they are attracted in great numbers to the beam.

The tower was designed by Ward H. Snook, president, and J. B. Allen, civil engineer of the Gulf Telephone Co. Its construction was under the supervision of John McClure Snook, general manager, and S. B. Stark Jr., construction manager for the company. The personnel of the erecting crew were all of the Gulf Telephone Co. Mrs. Zona Cross, office manager of the company, had the responsibility and honor of raising and positioning the poles.

The Budelman Radio Corp., with the help of Homer Deese, trouble manager, and James Larkin, central office and maintenance engineer, and Raymond Carter, radio engineer of both Coastal Communications and the Gulf company, installed the radio and central office equipment with the aid of the construction crew. Later, a stand-by generating unit was installed to guarantee the continuity of service in the event that the commercial power serving this isolated exchange should fail.

Need for Public Knowledge

"(Because schools have failed to teach science and mathematics either widely or well) we face a new type of illiteracy today in which citizens are unable to read and understand the things about which they must make decisions, all the way from spending billions on nuclear energy . . . to what to do about smog . . . Mathematics and science are great intellectual adventures that have enlarged and broadened man's intellectual horizons, freed the human spirit from ignorance and fear, and elevated him above a primitive existence."—LEE A. DUBRIDGE, *president, California Institute of Technology.*

MINNESOTA CONVENTION

Continued from page 38

and have proved that in the long-run, good earnings mean better service at lower rates.

"Can the public's mistaken concept be changed? I certainly think it can if we keep hammering away at the basic idea that we must be prosperous if we are to serve well. I don't believe the public, today, thinks that the lowest earning soap company makes the best and cheapest soap, or the lowest-earning automobile company the best and cheapest automobiles. . . .

"Why then should we let the idea hang on that the low-earning telephone company gives the best and cheapest service?"

Mr. Stocks also stressed the need for continued efforts to repeal the federal excise tax. If these efforts are unsuccessful, he said, "we face the perpetuation of an element in our rate structure that will penalize our customers unfairly and add permanently and substantially to the cost of telephone service."

New and future developments and experiments in the communication field cited by Mr. Stocks included:

Possibility, in certain circumstances, that a more convenient location of the dial wheel would be in the transmitter portion of the handset. Such a device is now on the market.

Use of a common ringer—separate from the set—in a centralized location in home or office, making possible a substantial reduction in the size of the set.

A home intercommunicating system that will permit the subscriber to talk between rooms, and also—by means of an exterior speakerphone at the front door—to talk with anyone standing on the front doorstep, from any part of the house.

A subscriber's set (experimental) that uses push buttons to furnish the dial impulses.

All-digit numbering systems (AND).

Pulse Code Modulation.

Transmission via wave guide with as many as 400,000 telephone conversations or 400 television programs being sent at the same time.

Electronic switching using networks of little gas tubes, with transistors and other new electronic devices "doing the brain work."

Multi-channel local pathways.

Integrated data-processing.

(Please turn to page 52)

EXPERIENCED

take care of your order at

1. Thorough Checking

by our warehouse personnel starts the moment your order is received. The order editor makes certain each item is properly described and identified by catalog number. This way, you're sure of getting exactly what you ordered.

2. Large Stocks

permit everything for your order to be picked right off our warehouse shelves. "Stock chaser" selects and inspects each item to be sure it's complete, ready for immediate use when delivered to you. Your orders are filled from an up-to-date stock of over 2,500 items.

3. Famous Brands

enable us to give you exactly what you want. Order checker goes over the whole shipment as it leaves the stock room. Close attention to detail is an important part of Automatic's supply service. Whether you order one item or a thousand, you always receive friendly, attentive service.

TELEPHONE MEN

Automatic's Supply Warehouses!

4. Careful Packing

of all the tools and supplies in your order requires ingenuity on the part of the order packer. His motto is, "pack 'em to protect 'em." And to be on the safe side, he checks the entire shipment against his packing slip to make certain everything is included.

5. Prompt Shipment

saves time. In most cases, your order is loaded on the truck within hours after it is received. Someone always checks to make sure the order is properly braced to insure safe arrival. No matter what you order from Automatic Electric, we do our best to get it to you in good condition, in the shortest possible time.

Automatic's 5 friendly warehouses:

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Illinois
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"Michie" Hester, Mgr.
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Portland 10, Ore.
CApital 3-7244

Fran Batcher, Mgr.
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Binghamton 7-8507

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HArrison 1-4720

AUTOMATIC ELECTRIC

A member of the General Telephone System—One of America's great communications systems

GENERAL SYSTEM

ELECTRONIC LADY. Mrs. Kay Kojek, holding an electron tube she's just tested, is one of over 3,000 employees at our Allentown Works. They help us make thousands of miniature electronic products for the Bell System . . . things like transistors, varistors, electron tubes.

ALLENTOWN, PA.

From its flower-trimmed main street to its humming factories . . . in its schools and civic gatherings . . . this bustling Pennsylvania Dutch community helps Western Electric make equipment that makes possible your Bell telephone service.

Any town that pretties up its lamp posts with flowers and waters them each night must be something special. Allentown, Pa., is that kind of city.

For ten years Allentown – where we make electronic telephone components for the Bell System–has been one of the home towns of Western Electric. As our employees, thousands of Allentonians have helped us with our job. Others have helped as employees of the 186 companies in town who furnish materials and supplies we need. (These companies, by the way, are just a fraction of our 2,336 suppliers throughout the state of Pennsylvania.)

Allentown, too, has benefited . . . through the jobs our work has made possible, in the payrolls spent with local merchants, in the taxes we have paid; and in the many ways in which we have become–either directly or through our employees – an integral part of the community itself.

Besides Allentown, Western Electric has factories in 25 other cities where we also make telephone equipment for the Bell System. Last year we purchased 1¼ billion dollars worth of raw materials, products and services from our nearly 33,000 suppliers located in every state. Of these, 90% are "small businesses." The things we make and buy are distributed to the Bell telephone companies through Western Electric distribution centers in 32 different cities.

Western Electric

MANUFACTURING AND SUPPLY UNIT OF THE BELL SYSTEM

BUSINESS BOOMS for Walter Jenkins' machine shop. Walter (left), one of the 186 local suppliers of Western Electric, says his business has doubled since he became one of our suppliers. He's shown here with Charlie Bender of our purchasing organization.

ON DUTY with the volunteer county Civil Defense unit, Western Electric employees Doug Morick (left) and Glen Cowher test a mobile radio set. Other W. E. people help out in community activities such as scouting, Little League baseball and many more.

THE CITY'S VOICE, Editor Bill Reimert of the Allentown Call-Chronicle. Bill recalls how Western Electric's coming to town took up the slack in post-war production. He feels that Western Electric's active part in community affairs and its concept of community service has been as good for his town as the jobs made and the taxes paid.

OPERATION SANTA CLAUS. W. E.'s Allentown Club, to which all Western Electric employees belong, sponsors Operation Santa Claus each year. Shown here are some of the gifts our employees have donated for needy youngsters in the Lehigh Valley.

Final speaker on the program was Lafayette A. Hooser, vice president of the Indiana Right to Work Committee, Inc., Indianapolis, Ind. His subject was "The Lost Freedom of Choice."

The association elected the following new directors for three-year terms: Kenneth Ellefson of Ada; Dell Ludenia of Osakis; Kenneth Peterson of Kerkhoven; W. L. Stocks Jr. of Minneapolis, and A. G. Stradtman of St. James.

The directors re-elected the following officers: President, H. James Boyd of Alexandria; vice president, Carl M. Ostby of Erskine, and secretary-treasurer, Keith W. Vogt of St. Paul.

The other directors are: H. James Boyd of Alexandria; Charles R. Cashel of Worthington; Eldon Eckles of Blue Earth; J. F. Eitzen of Mountain Lake; Elnathan C. Gates of Minneapolis; Paul A. Glaeser of Springfield; John G. Holland of New Ulm; Herbert J. Lien of Blackduck; C. F. Marvin of Zumbrota, and Carl M. Ostby of Erskine.

REA Approves $3,122,000 In Rural Telephone Loans

THE Rural Electrification Administration has approved the following rural telephone loans:

Seminole Telephone Co., Donalsonville, Ga.; $747,000; Feb. 17.

The loan funds will enable the new borrower to provide improved service for 756 present subscribers and initial service for 549 rural subscribers. The borrower is now furnishing dial service through central offices at Donalsonville, Iron City, and Jakin.

New construction scheduled includes automatic central office buildings to replace the present limited dial facilities at Iron City and Jakin.

W. E. Quattlebaum Sr. is president and manager of the Seminole company.

•

Craw-Kan Telephone Cooperative Association, Girard, Kan., $144,000; Feb. 17.

The borrower plans to use the loan funds to improve service for 198 existing subscribers and to furnish initial service to 55 farm families. These subscribers now receive magneto service from the Uniontown Mutual Telephone Co., which the borrower proposes to acquire.

A new automatic central office will be constructed at Uniontown.

The present and three prior REA loans totaling $2,271,000 will enable the borrower to provide new and improved service to 5,096 rural subscribers. The completed system will consist of 15 exchanges of which eight are in operation now and which serve approximately 3,600 rural subscribers.

S. O. Frey is president and John Frerichs is manager of the Craw-Kan cooperative.

•

Leewood Telephone Co., Richmond, Mo., $517,000; Feb. 17.

The new borrower plans to use the loan funds to convert its magneto system to automatic operation and to acquire the Clearfork Telephone Co. At present the borrower serves 106 subscribers through magneto exchanges at Leewood and Regal. The Clearfork company serves 648 subscribers through a common battery exchange at Garden City, and magneto switchboards at East Lynne and Latour.

New construction scheduled by the borrower includes an automatic exchange near Leewood, which will also serve the Regal community. The present common battery equipment at Garden City and the magneto switchboard at East Lynne will be replaced with new automatic facilities. The Latour community will be served through the Garden City exchange. Rehabilitation and new construction will enable the Leewood company to serve 261 rural families now with no telephones.

Jack A. Rickel is president and John W. Breed is manager of the Leewood Telephone Company.

•

Chariton Valley Telephone Corporation, Bucklin, Mo., $637,000; Feb. 17.

The borrower proposes to use these funds to acquire the facilities of the Bosworth Telephone Co., and to complete the system authorized under previous loans. The Bosworth company is now providing magneto service to 360 rural subscribers and switchers. The borrower plans to provide automatic service for the Bosworth community and the adjacent DeWitt area.

New automatic offices are scheduled at both Bosworth and DeWitt. Improvements and expansion will enable the borrower to provide better service for 276 rural subscribers and to furnish initial service to 181 families.

REA loans to the borrower totaling $2,636,000 to date will make possible new and improved service for 5,195 rural subscribers. The completed system will consist of 14 exchanges of which those at Bucklin, Bynumville, Ethel, Jacksonville, and Prairie Hill are in operation, serving about 3,200 subscribers.

George T. Holman is president and Earl L. Bennett is manager of the Chariton Valley Telephone Corp.

•

West River Mutual Aid Telephone Corp., Hazen, N. D., $283,000; Feb. 19.

The loan funds will enable the borrower to serve additional territory and to provide service to 359 rural families of which 213 have no telephones. The remaining 146 families now receive magneto service from the following companies which West River proposes to acquire: Oliver-Mercer Telephone Co., Hanover Telephone Co., and Springbrook Telephone Co., all of Center; and the Wilcox Brothers Telephone Co., Hensler. In addition, the Center Telephone Co. plans to abandon its service area to the borrower.

New construction scheduled by the borrower includes an automatic central office at Center to serve the expanded area.

REA loans totaling $2,247,000 to date will enable the borrower to furnish new and improved service to 3,450 rural subscribers. The company's Beulah, Hazen, Mercer, Stanton, Turtle Lake, and Washburn exchanges are now providing dial service to approximately 1,300 subscribers. The remaining exchanges will be at Center, St. Anthony, Selfridge, and Solem.

Oscar Carlson is president and Donald H. Brooks is manager of the West River Mutual Aid Telephone Corp.

•

Northwest Louisiana Telephone Co., Shreveport, $55,000; Feb. 21.

The present and two prior REA loans totaling $398,000 will enable the borrower to furnish new and improved service to 906 rural subscribers. The completed system will consist of automatic exchanges at Cotton Valley and Rodessa.

Lee Roy Hagin is president and manager of the Northwest Louisiana Telephone Co.

•

Amberg Telephone & Telegraph Co., Wausaukee, Wis., $251,000; Feb. 25.

These funds will be used by the borrower to improve service for 247 existing subscribers and to furnish initial service for 133 farm families.

The present subscribers are now re-

ceiving magneto service from the Harmony Telephone Co., Harmony Corners, which the borrower plans to acquire. According to present plans, a new automatic central office will be constructed at Harmony Corners.

REA loans totaling $825,000 will enable the borrower to furnish new and improved service to 1,724 rural subscribers. Five of the proposed six exchanges are in operation serving approximately 1,050 rural subscribers.

Robert H. Keating is president and manager of the Amberg Telephone & Telegraph Co.

•

Poland Telephone Co., Raymond, Me, $89,000; Feb. 26.

The present and a prior REA loan totaling $596,000 will enable the borrower to provide new and improved service to 1,340 rural subscribers. The completed system will consist of four automatic exchanges that are now in operation at Casco, Naples, Poland, and Raymond.

Charles W. Ricker is president and manager of the Poland Telephone Co.

•

Millington (Tenn.) Telephone Co., $399,000; Feb. 28.

The borrower plans to use these funds to improve service for 359 existing subscribers and to provide initial service for 359 farm families. The current subscribers are now receiving magneto service from the Mason Telephone Co. and the Stanton Telephone Co. whose facilities the borrower expects to acquire.

In addition, it plans to acquire the PBX system of the U. S. Naval Air Station at Millington, now owned and operated by the Southern Bell Telephone & Telegraph Co.

Sites will be purchased and new automatic central offices constructed at Mason and Stanton.

REA loans to this borrower totaling $2,042,000 to date will enable it to provide new and improved service to 4,990 subscribers. The completed system will consist of four exchanges, of which Millington and Munford are now in operation.

W. S. Howard is president and manager of the Millington Telephone Co.

Anxiety As An Enemy

"It is not work that kills men; it is worry. Work is healthy; you can hardly put more upon a man than he can bear. Worry is rust upon the blade. It is not the revolution that destroys the machinery, but the friction. Fear secretes acids; but love and trust are sweet juices."—BEECHER.

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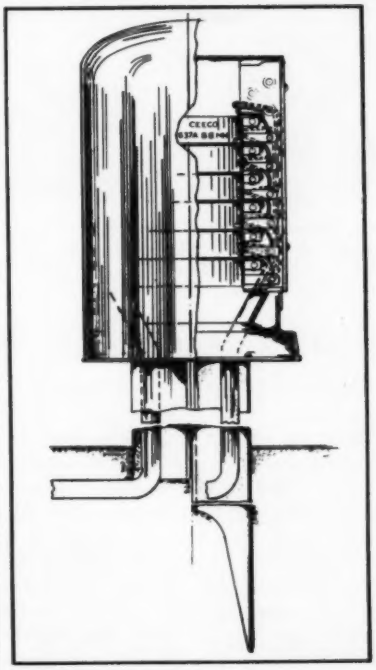
CEECO PARKWAY PEDESTAL TERMINALS FOR LOADING DIRECT EARTH BURIAL PLASTIC CABLES
Using Type C637A (88MH) or Type C637B (44MH) Coils



Lug-12 Terminal and Pedestal with C637A-(88MH) loading coils or C637B(44MH) loading coils

★ECONOMICAL

LOAD ONLY NEEDED PAIRS—ADD TO FULL CAPACITY AS REQUIRED

★ACCESSIBLE

ANY OR ALL PAIRS

★STRONG

ALL STEEL CONSTRUCTION PROTECTS CABLE—"BELL JAR" TYPE COVER

★PROTECTION

SIDE PLATES GIVE NOMINAL AIR GAP TYPE PROTECTION AT EACH TERMINAL STUD END

CEECO Parkway Pedestal Loading Terminals for plastic cable provide accessibility to all cable pairs, for testing, splicing, cross connecting, and buried drop wire distribution.

The type C637A(88MH) or C637B(44MH) load coils are completely encapsulated in plastic—moisture tight—high dielectric strength. These coils are same type used in CEECO type 177 terminals on rural distribution wire. These coils are interchangeable in both terminals and can be installed with standard ⅜" socket wrench. Coils are stock item.

CATALOG NUMBER	DESCRIPTION	TOTAL NUMBER PAIRS HIGH	TOTAL NUMBER COILS	INSIDE HOOD DIAMETER	APPROXIMATE HEIGHT OF HOOD
LUG-12	TERMINAL-PEDESTAL AND HOOD (NO COILS)	6	12	6 ID	11"
LUG-16	TERMINAL-PEDESTAL AND HOOD (NO COILS)	8	16	6 ID	14"
LUG-28	TERMINAL-PEDESTAL AND HOOD (NO COILS)	14	28	6 ID	21½"
LUG-52	TERMINAL-PEDESTAL AND HOOD (NO COILS)	26	52	6 ID	32¾"

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CEECO loading coils are sold by your telephone equipment supplier

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1700 Broadway AComa 2-3623

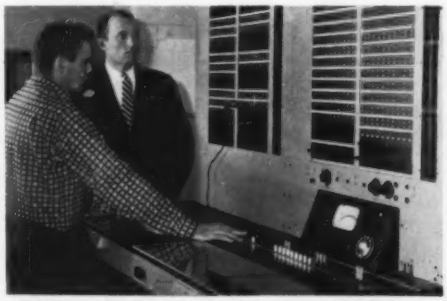
The Nixons of Westfield, N. Y. Seated is Sam F. Nixon, president of the Chautaugua & Erie Telephone Co. Standing with him here, as they have all through the company's modernization program, are his sons (L-R) Alastair, Roderick and S. Fred Nixon Jr.

Dial Conversion at Westfield, N. Y.— Family Enterprise for 3 Generations

Back in 1897 S. F. Nixon brought the first telephone service to Westfield, principal city in the southwest corner of New York state. His son, Sam F. Nixon, took over the job in 1906—is now president of the Chautauqua & Erie Telephone Co. In turn Mr. Sam Nixon has raised three sons, all good telephone men in their own right: S. Fred Nixon Jr., general manager, and from 1953-55 president of the New York State Telephone Association; Roderick Nixon, commercial manager, and Alastair Nixon, plant manager.

Westfield is the toll-center and largest office in the six-exchange operation; its conversion on Mar. 2 made the system 100 per cent dial. A 2200-terminal XY-Dial system, and six-position toll board equipped with key senders for more efficient participation in the Nationwide Operator Toll Dialing network, provide the modern nerve-center for an area that has seen telephone usage increase 200 per cent in the last 10 years. The program will be culminated soon in Direct Distance Dialing (DDD) service for Westfield and surrounding towns.

The 6300 subscribers—even those who had the same directory number for 52 years—salute the faith and the accomplishment of the Nixon family in bringing the improved service to their community.



ABOVE: Roderick A. Nixon and Edward Knight, testman, try out new test board engineered especially for Westfield. The board, divided into two sections, includes jacks for inter-toll testing on left side; tributary (local trunks) testing on right side. RIGHT: Final check of new equipment just prior to cutover. Five other dial exchanges in system trunk into this office.

Kellogg Sets Up 6 Regional Offices in Decentralization

O. C. Bailey, who was recently advanced to general sales manager of Kellogg Switchboard & Supply Co., guided the International Telephone & Telegraph Corp. division's recent sales managers meeting held as part of a decentralization program.

Mr. Bailey and his staff from the main plant in Chicago met with the six new regional managers in San Mateo, Cal. on Mar. 7 to 10 to climax the move.

The decentralization program, which includes the establishment of the regional offices, is designed to provide more direct and effective sales service to Kellogg customers in all sections of the country, Mr. Bailey explained.

"This could only be done by delegating full responsibility and authority to regional managers who are in close working relations with our customers," the general sales manager said.

The new regional managers, their territories and office locations are: R. H. Smythe—Southeastern—Atlanta, Ga. (1594 Southland Cir. N.W.); C. F. Cheney—Eastern—Passaic, N. J. (165 Prospect St.); W. G. Vance—North Central—Chicago, Ill. (5924 S. Pulaski Rd.); R. M. Pirnie—South Central—Kansas City, Mo. (4501 Truman Rd.); K. C. Tompers—Western—Burlingame, Cal. (23 Broderick Rd.); and J. A. Russell—Export—also located at the Passaic, N. J. address.

"These regional sales managers are, in turn, supported by a headquarters staff of sales product managers," Mr. Bailey pointed out. "The Kellogg line is thus strengthened immeasurably in every respect."

Ready to assist the regional managers in their operations is a staff of product sales managers. These sales managers and the Kellogg products they represent are: J. Robert Roe, telephone instruments; Norman W. Eckhardt, central office switching; J. A. Meyers, dealer commercial products; C. A. Gunn, industrial; F. A. Rundle, supplies and cable; Wade K. Marsh, general sales service engineer, and A. Svehlik, general sales analyst.

All, except Mr. Gunn, have been affiliated with Kellogg in other capacities before their present assignments. Mr. Gunn assumed his duties with Kellogg in January. He was previously manufacturers' representative for Reliable Electric Co. and Whitney-Blake Co.

Headquarters management personnel accompanying the general sales manager to the conference were Edwin Rousch, director of industrial rela-

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SOLVES THOSE OVER-FLOOR WIRE JOBS!

Here's the one floor duct that solves over-floor wiring problems easily and quickly. There's no drilling, no special tools, no mess when you install Flexiduct. Using just a knife and the special cement, Flexiduct can be installed much more easily and in less time than other types of floor duct. You achieve a neat-looking job that affords adequate protection from sweepers, mops and equipment on casters. Flexiduct's flexibility allows it to adhere evenly and securely to all types of floor surfaces, yet it can be removed without harm to floor should it be so desired. Flexiduct is adaptable for installations ranging from 2 conductors to 25 pair switchboard cables. Prove it to yourself that Flexiduct works best, looks best and costs less per installation.

It's Neat-Looking and Easy to Install . . . .

- 2 DUCT SIZES plus
- QUARTER-ROUND DUCT
- FITTINGS USED WITH BOTH DUCT SIZES
- AVAILABLE IN BLACK RUBBER OR BROWN PLASTIC

Write for Circular 258-A

BUCKEYE TELEPHONE & SUPPLY CO.

Your Friendly Supply House

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NEW KLEIN

stripping tool

for all types of control cable

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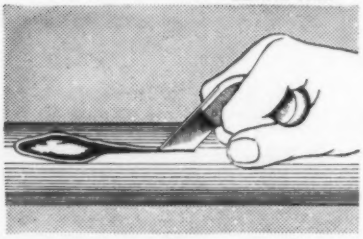

Here is a new tool developed by Klein, designed to strip insulation from all types of control cable, flexible cords, PWC, telephone cable with vinyl or polyethylene jackets and bus drop.

Handle of cast aluminum, light in weight and with convenient grip; knife of tempered tool steel may be sharpened and is easily removed for replacement. This tool strips insulation from a few inches to as many feet as desired swiftly and simply. Does not damage conductors inside weatherproof sheath.

Write for bulletin giving complete information.

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100 years of service to linemen, electricians and industry is back of this new Pocket Tool Guide No. 100. A copy will be sent you on request without obligation.

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Led by O. C. Bailey (fifth from right), general sales manager, Kellogg Switchboard & Supply Co. executives from the main plant in Chicago meet at San Mateo, Cal., with managers of the six new regional offices. Those attending the International Telephone & Telegraph Corp. division's conference on Mar. 7 to 10 were (left to right): R. M. Pirnie, J. R. Roe, Ralph Smythe, C. A. Gunn, William Vance, C. F. Cheney, K. C. Tompers, Mr. Bailey, Charles Kane, Fred Rundle, Louis Olszyk and J. A. Russell.

tions; Messrs. Roe, Rundle, and Gunn; Charles Kane, manager of systems and procedures, and Louis Olszyk, advertising-public relations manager.

Mr. Bailey and his staff presented new projects, products and plans to the new regional managers.

As part of their visit to the West Coast, the group traveled to nearby Palo Alto, Cal., to visit the IT&T Federal Telecommunications Laboratories. Several new products, scheduled to reach the markets in the near future, were unveiled for the visitors at this development plant.

Mr. Bailey, the guiding force behind the decentralization maneuver, is widely known in the telephone industry. He joined Kellogg as a field sales representative following World War II in which he served for three years as an Air Force flying officer.

He has since earned promotions which carried him through posts as district manager, assistant manager of the Western division, manager of the Southwestern division, assistant sales manager and sales manager to his present position.

Federal Laboratories Names New Systems Supervisor

John E. Stockton has been promoted to the post of supervisor of systems and procedures, in the organization and methods planning office of Federal Telecommunication Laboratories, Nutley, N. J., a division of the International Telephone & Telegraph Corp., it was announced on Mar. 5.

Mr. Stockton has more than 13 years experience in the industrial engineering field. Prior to joining FTL in 1956, he was with the Curtiss-Wright Corp., where he served as the industrial engineer responsible for the methods evaluation unit in the industrial engineering and planning department. He has also served as methods engineer with the American Cyanamid Co.

He is a graduate of the Newark College of Engineering with a Bachelor of Science degree, and holds a Master of Business Administration degree from New York University.

American Teletype Parts Moves to New Headquarters

American Teletype Parts Corp., distributors of teletype equipment, has moved its headquarters to 23 Park Place, New York 7, N. Y., Murray Platt, president of the firm, announces.

The company helped supply many of the communications companies, press services and railroads with much-needed teletype equipment at the conclusion of World War II.

American Teletype Parts Corp. maintains a large inventory of new and reconditioned equipment and replacement parts for all types of teletype applications.

Link Peru Companies

Peru's three telephone companies have connected their services. Compania Peruana de Telefonos serves Greater Lima; Compania Nacional de Telefonos, a Swiss-Peruvian company, operates all long distance lines in the country; and Sociedad Telefonica del Peru provides local services in Cuzco and Arequipa.

False Pride

"Arrogance is the obstruction of wisdom."—BION.

TIME IS THE MEASURE OF ALL WOOD PRESERVATION

Utility pole, railroad tie or prized fly rod – the question of wood preservation is important.... The answer for industry – proved by over 50 years of service records – is AMCRECO pressure treatment.

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SNUB-R-GRIP DROP WIRE GRIP

On poles or buildings this free-swinging drop wire tie provides a "snubbing" action stronger than the rated strength of the wire. This is possible because the unique spiral grip distributes the pull over a long length of wire. KEARNEY Snub-R-Grips are quickly installed and easily salvaged. Just wrap the wire (twisted pair, parallel or synthetic-jacketed) into the grooved spiral. A portion of the groove's inner surface is specially coated to give maximum non-slip grip . . . without damage to insulation.

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News on New Products

INSULATION STRIPPING TOOL—This tool, developed by Mathias Klein & Sons, is designed to strip insulation from all types of control cables, flexible cords, PWC, telephone cable with vinyl or polyethylene jackets and bus drops.

Handle of cast aluminum, light in weight and with convenient grip; knife

of tempered tool steel may be sharpened and is removed for replacement. This tool strips insulation from a few inches to as many feet as desired swiftly and simply. Does not damage conductors inside weatherproof sheath. Request NP 836.

•

MASONRY DRILL — Holub Industries, Inc., has introduced a new masonry drill with "Fast-Spiral" flutes that quickly lead the drilled material up and out of the hole. Fast removal or cleaning action is obtained by flutes that lead from *both* cutting edges of the carbide tip.

It is claimed that this unique design permits drill to be used continuously in concrete, brick, stone and other masonry materials. It cuts clean and fast and packing and stalling are eliminated, it is said.

The cutting tip is solid carbide and the shank is made of a special alloy

steel. This combination assures more cuts with less sharpening, longer drill life and lower drilling costs, the company states.

Drill sizes range from 11/64 inch to 1½ inch. Each individually packed in a plastic tube to protect the carbide tip when not in use. Also available are handy kits of three and four popular sizes. Request NP 837.

•

"HAMMER-IN" TOOL—A new multi-purpose tool, which can be used both for hammer-in fastening work and for manual drilling, has been introduced by Ramset Fastening System, a division of Olin Mathieson Chemical Corp.

The tool combines a masonry drill holder with the regular Shure-Set hammer-in tool. This allows a craftsman to fasten directly into hard materials such as concrete, cinder block and mortar with the same tool he uses to drill holes into such brittle materials as face brick or tile. The tool sets studs as well as non-threaded fasteners.

Development of R-360 comes just 21 months after the introduction of the Shure-Set hammer-in tool. Shure-Set utilizes the power supplied by swinging a hammer to fasten into a variety of

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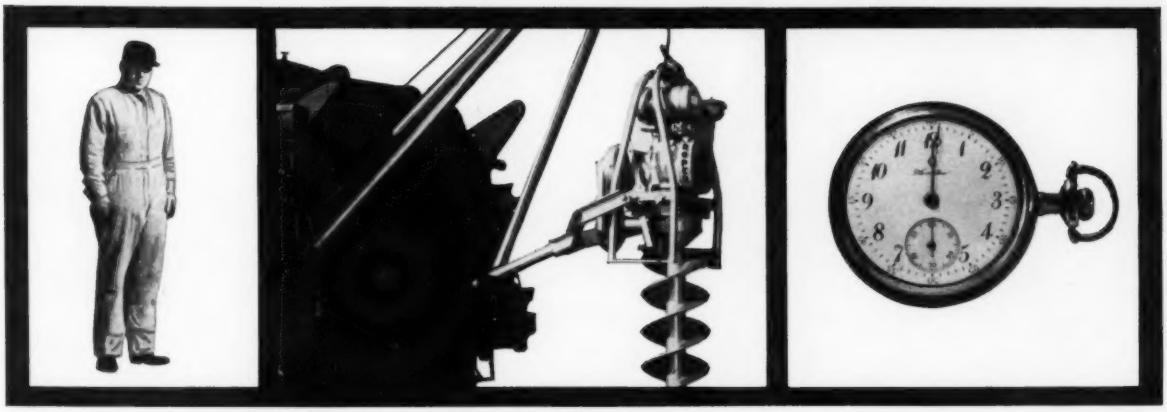
3/22/58

what does it take to get from one pole to the next?



one man, a Roper automatic hole digger, a minute!

You save man-power with the Roper automatic pole hole digger. You save time, too. In good digging, the Roper digs 14" diameter holes 5 feet deep in just one minute. In rough digging, it may take slightly longer *but you never need additional men to help ride a Roper.* That's because the digging weight is directly over the rugged auger.

The Roper can reach hard-to-get at places and can dig a straight or angle hole from any truck, jeep or tractor equipped with front or rear boom and winch. *No expensive power take-off is needed.* In 4 years of operation, one Roper dug 7,000 holes without needing repair. Write today for prices and specs!

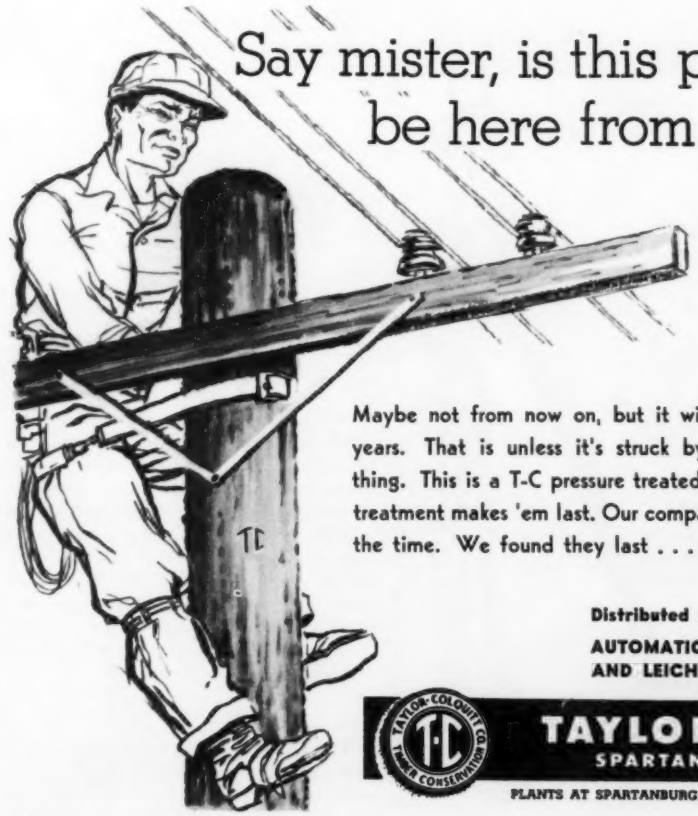
Standard unit depth 6 ft. Maximum digging depth 25 ft.

Distributed by Graybar — *Ask your Graybar representative about the Roper automatic hole digger!*

ROPER Roper Manufacturing Company 250 Elm St., Zanesville, Ohio

---

Say mister, is this pole gonna be here from now on?

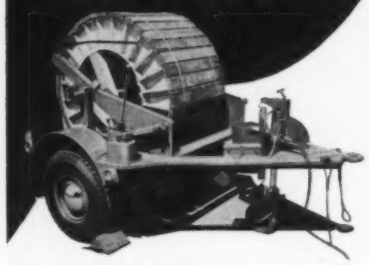


Maybe not from now on, but it will last for years and years. That is unless it's struck by lightning or something. This is a T-C pressure treated pole. T-C's pressure treatment makes 'em last. Our company uses T-C poles all the time. We found they last . . . almost from now on.

Distributed by
AUTOMATIC ELECTRIC SALES CORP.
AND LEICH SALES CORP.

TAYLOR - COLQUITT CO.
SPARTANBURG, SOUTH CAROLINA
PLANTS AT SPARTANBURG, SOUTH CAROLINA AND WILMINGTON, NORTH CAROLINA

TRUCO Lightweight WIRE CARRIER



- ▶ Hydraulic Reel Lift
- ▶ Hydraulic Front Support
- ▶ Spring Suspension
- ▶ Up to 4000 lb. loads

All hydraulic operation for easy one-man loading and unloading.

Other Truco Hydraulic Reel carriers available in capacities up to 14,000 lbs. Special large capacities built on order.

Truco

TRUCK Equipment CO.

3963 Walnut Street
Denver 5, Colorado

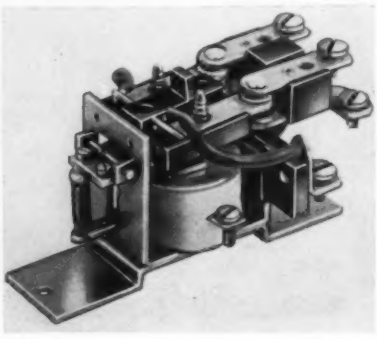
non-brittle materials and into thin steel.

For heavier fastening work Ramset has a professional model called R-150. The kit consists of the tool, a two-and-a-half pound hammer, a levelling plate and a fastener apron. An additional barrel is available for this tool so that 3/16-inch fasteners as well as ¼-inch fasteners can be set. Request NP 838.

•

INDUSTRIAL RELAY — Wheelock Signals, Inc., offers a plug-in general purpose industrial relay, available in a wide range of ac and dc coil voltages with contact arrangement 2 Form C rated 20 amperes at 115 volts ac or 24 volts dc.

This general purpose relay features standard plug or jack terminals for rapid attachment to mating fixture on users' equipment.

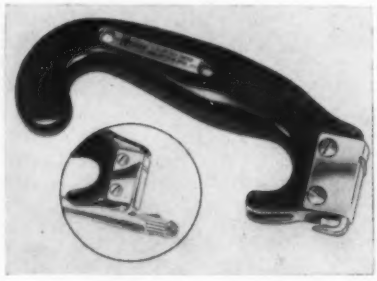


The unit's small size and compactness suggests typical applications in motor control circuits, starter for fractional hp motors, operation of signalling devices, pressure switches, liquid level controls, machine tools, street lighting, motor-generator sets, power supplies, welders, etc. Request NP 839.

•

CABLE SHEATH STRIPPER—A new tool for stripping sheath from all sizes of plastic and fabric covered cable has been announced by P. K. Neuses, Inc.

This tool consists of a red phenolic handle equipped with a razor blade protected with an L-shaped combination guide and guard.



A stainless steel saddle holds the guide and blade in place. The saddle is secured to the handle by a pair of screw bushings and screws. An auxiliary groove in the handle supports and guides the cable. Handle is so shaped that the worker's hand is fully protected. The shape of the guide protects the enclosed wires from any possibility of damage while slitting sheath. Two extra blades are carried in slot in the handle. Request NP 840.

•

FASTENING DRIVE TOOL—A new fastening drive tool designed specifically for telephone installations has

NOW...the "Lineman's Hoist" in a New TWO-TON Capacity

Now... a big brother to the popular Chance One-Ton Hoist... a Two-Ton Hoist with the same mechanical simplicity—plus precision gearing that doubles load capacity. Bigger, stronger, it has all the features linemen from coast to coast suggested in helping to develop the Chance One-Ton Hoist.

Easy-to-grip well-balanced handle operates from either side. "Free-wheeling" for ease in hooking to load. Automatic locking prevents accidental dropping of load. Chain won't bind or kink. Half or full link take up. Controls can be worked with gloves. 360° swivel hook with optional safety latch.

SAFETY LATCH HOOK
Optional at slight extra cost.

TWO-TON
Rated to lift a two-ton load. Proof-tested to 6000 lbs. before shipment. Weighs only 24 lbs.

Order from your line equipment wholesaler.

A·B·CHANCE CO·

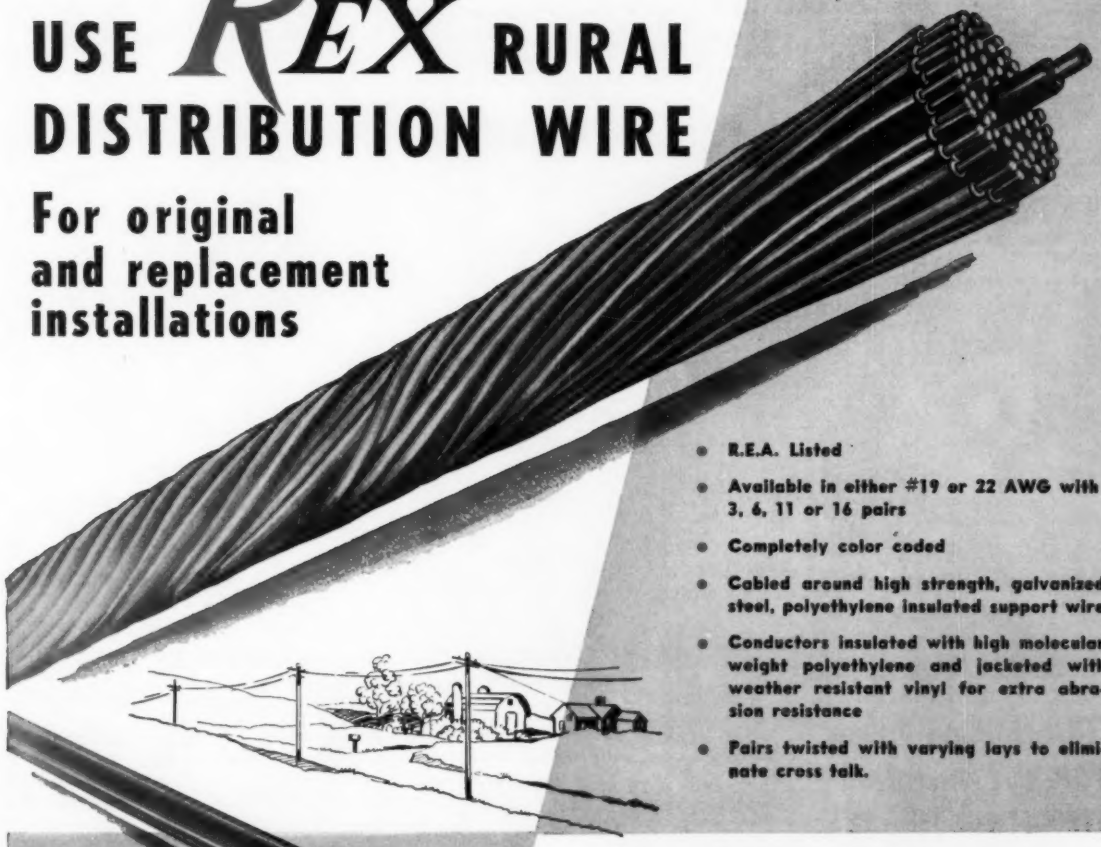
GENERAL OFFICES: CENTRALIA, MO.
(A. B. Chance Co. of Canada, Ltd., Toronto)

CT58-8A

MAXIMUM EFFICIENCY AT MINIMUM INITIAL COST . . .

USE REX RURAL DISTRIBUTION WIRE

For original and replacement installations



- R.E.A. Listed
- Available in either #19 or 22 AWG with 3, 6, 11 or 16 pairs
- Completely color coded
- Cabled around high strength, galvanized steel, polyethylene insulated support wire
- Conductors insulated with high molecular weight polyethylene and jacketed with weather resistant vinyl for extra abrasion resistance
- Pairs twisted with varying lays to eliminate cross talk.

CUT POLE LINE COSTS WITH REX ONE PAIR

(Type C Distribution Wire)

- For span lengths up to 600 ft.
- Parallel conductors are encompassed in high molecular weight, weather resistant polyethylene
- Raised ridge tracer provides polarity identification
- Easily installed
- High electrical characteristics
- Available in #14 or #12 AWG copperweld or .083 steel

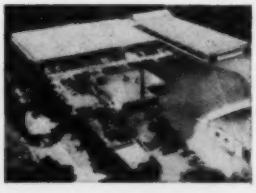
SEND FOR COMPLETE TECHNICAL DATA AND SPECIFICATIONS.

REX WIRE & CABLE

Manufactured by

THE REX CORPORATION

100 HAYWARD ROAD, WEST ACTON, MASS.



TELETYPE

AMERICAN TELETYPE PARTS CORP.

A specialized source for Teletype Equipment and Parts with over a decade of dependable service.

We maintain large inventories of the following reconditioned like new and new equipment. Machines are altered to meet your specifications.

MODEL 14
MODEL 14 TYPING REPERFORATOR
MODEL 15
MODEL 19
TRANSMITTER DISTRIBUTORS
RECTIFIERS
RELAYS

We also stock a large parts inventory to meet your specific replacement needs.

Our prices are competitive and in most cases present considerable savings. We accept trade-in units under most favorable terms and are open to purchase any excess inventories.

ALL INQUIRIES PROMPTLY ANSWERED

AMERICAN TELETYPE PARTS CORP.
23 PARK PLACE • NEW YORK 7, N. Y.
Phones: COrtlandt 7-2575-6-7

EXTRA Holding Power
QUICKLY Installed
TOUGH For long life

EVERSTICK ANCHORS

For new construction and maintenance — Everstick Anchors speed up work and provide dependable anchorage on all types of jobs. Made of resiliant, rust resistant malleable iron. The toughest anchors made. Write for bulletin.

EVERSTICK ANCHOR CO.
FAIRFIELD, IOWA

been announced by Hilti Rapid Fastening Systems, Inc.

With this new drive tool, fastenings can be made directly into concrete, masonry, brick, composition blocks, and steel, without drilling, plugging or explosives.

The tool is precision-machined of hardened steel, with steel drive ram and extra protection of a moulded rubber safety hand grip.

The Hilti T-25H is used in combination with a 2½ pound hammer and Hilti "conic" fasteners, to fasten equipment backboards, drive-rings, wire-clasps, cable-clamps, mouldings, terminals, etc.

The made-to-match "conic" fasteners are rust-proofed and are available in drive pins, ¼-inch-20 and 8-32 threaded studs, and drive-ring fasteners — in a complete assortment of lengths up to 4 inches. Their "conic" design gives secure holding power with minimum penetration. Request NP 841.

•

TELEPHONE BOOTH—Suttle Equipment Corp. has introduced a full-length, folding-door solid oak telephone booth (Model A-10) with a patterned, steel lining.

Called "Rigid-Tex," the interior material is capable of withstanding years of public abuse. The seat and paystation mounting shelf are also of solid oak.

This line of telephone booths is available with a quietly operating ventilating fan and a light which is auto-

TELE-MUFF Jr.

The Head Set Ear Cushion
Designed Especially for Switchboard Operators

Made of Soft Pliable Vinyl Foam

- **Easy on Ear**
- **Inexpensive**
- **Attractive**

Write for Details

Thanks for your splendid response. All orders being shipped promptly.

TELE-MUFF CO.
Box 832
San Fernando, Calif.

"OFF-JOB TRAINING"

by HARRY C. WALKER, Ph.D.

Training Today Means Production Tomorrow

With a quarter century of practice and experience in job training, Dr. Walker treats the teacher and learner fully.

Written in straightforward English, there is an abundance of practical suggestions for lesson planning, classroom procedures, training aids, and many worthwhile topics.

Price $1.75 each including delivery.

•

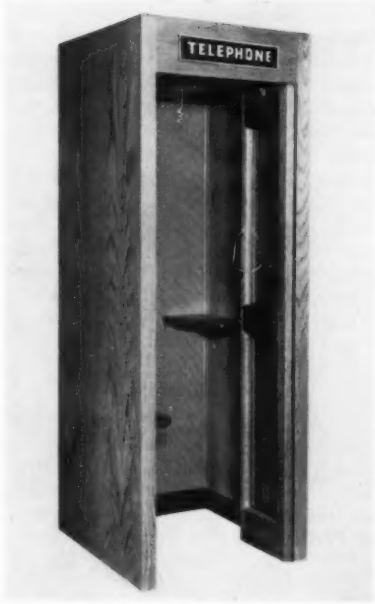
A New book for your job instructors.

Management, as well as each Department Head, Supervisor, Foreman, or Trainee realizes today the importance of proper and efficient job training.

•

ORDER FROM

TELEPHONY PUBLISHING CORPORATION
608 SOUTH DEARBORN STREET
CHICAGO 5, ILLINOIS

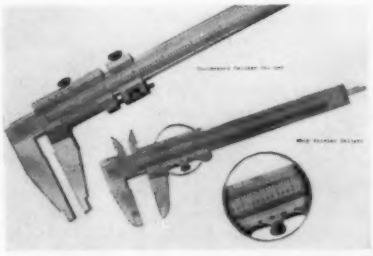


matically operated by the movement of the hinged two-piece folding door. Servicing of the fan and light is easy and quick through an access on the top of the booth.

The black-lacquered brass "Telephone" sign is standard equipment. Request NP 842.

•

CALIPER—A new caliper design announced by the George Scherr Co.—the new "Lustro-Chrome" stainless steel vernier caliper—takes the glare out of caliper readings, a vital aid for measuring instantaneously and accurately in 1/1000ths of an inch, even under poor lighting.



A radically new raised edge design was created to give full and lasting protection to the dull chromed surface—the raised edges acting as a guideway for the vernier scale.

For extra easy reading, a double length vernier has been added. Stainless steel makes the tool rustproof against atmospheric conditions and perspiring hands. By a new technique, jaws as well as beam are fully hardened throughout for long life.

Their toolmakers' vernier caliper has extra long jaws and sensitive fine ad-

GENERAL MACHINE PRODUCTS COMPANY, INC.
Old Lincoln Highway at Pa. Turnpike, Trevose, Pa.

Aerial Tents
Cable Benders
Cable Blocks
Cable Lashers
Coaxial Cable Tools
Lashing Wire Clamps and Grips
Portable & Power Reels

Pressure Testing Kit

R S Power Reel

C R Power Reel

D Cable Bender

B, C, D, E & G Cable Lashers

Special Purpose Tools To Specifications
Literature on Request

Over 500 various items of Line Construction Tools, Maintenance & Pressure-Testing Equipment in stock for immediate Shipment

SPECIALIZED COMMUNICATIONS EQUIPMENT SINCE 1918

GMPCo

Transmission Engineer

FOR I T & T's SERVICE DIVISION "WHITE ALICE"

Long Lines Communications Network Project in Alaska

Rare Opportunity for BS EE in Electrical Engineering or Equivalent, With at Least 6 Years Communications Engineering of Which 3 Years is in Transmission Work

To make studies and perform professional duties pertaining to the operations and transmission performance and aid in establishing transmission standards of the system. This involves the practical application of the elements of the network which includes micro-wave and beyond-horizon radio equipment, voice carrier equipment, voice frequency telegraph equipment and associated or auxiliary transmission equipment.

Excellent Salaries Plus Living Allowance for Limited Time

Enjoy the adventure and pioneering atmosphere associated with establishing the new "White Alice" long lines communications network project in Alaska, a virtually new and growing territory, filled with opportunity and enthusiasm. IT&T Service Division, Federal Electric Corporation, has been chosen to maintain and operate this new communications network.

Also you will be joining the ever-expanding Federal Electric Corporation, Service Division of the world-wide International Telephone & Telegraph System, the world's largest American owned international organization devoted to electronic and telecommunication systems.

If You Qualify Send Detailed Resume to Mr. S. Brand

Federal Electric Corporation

IT&T SERVICE DIVISION
INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION

Route 17 & Garden State Parkway, Paramus, New Jersey

justment screw and is available with 8-inch, 10-inch and 12-inch measuring capacity.

The shop vernier caliper is designed for measuring of outside, inside and depth dimensions with a measuring capacity of 5-5/16 inch. The cross-horns permit measuring the diameter of the smallest holes and distances between them. The graduations on both models are 1/1000 inch on lower scale and 1/128 inch on upper scale. Request NP 843.

•

INSULATION—It has been announced by George F. Rolfe, president of Hitemp Wires, Inc., that this company has achieved successful production and striping of wire utilizing E. I. du Pont de Nemour's new Teflon 100-X (Perfluorocarbon resin).

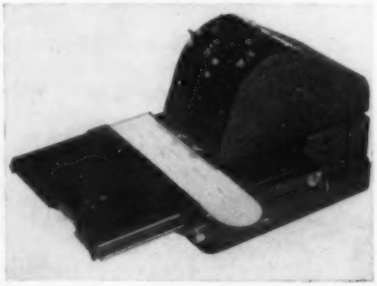
100-X is a new high temperature thermoplastic material suitable for insulating hook-up and lead wires, as well as for jacketing multi-conductor cables. Wire insulations made from 100-X have electrical, chemical and mechanical properties similar to Teflon (Tetrafluoroethylene resin).

The new Teflon 100-X (Perfluorocarbon resin), due to its chemical structure, will withstand temperatures as high as 400°F., thereby approaching the outstanding heat range characteristics of Teflon (Tetrafluoroethylene resin).

The current supply of 100-X is sufficient only for evaluation purposes, proto-types and some priority items, pending completion of Du Pont's facilities for volume 100-X resin production in 1959. Request NP 844.

•

ELECTRIC QUICK-SET PRINTER—The Ajax Electric Quick-Set machine and adjustable slide-in platform has been designed for telephone company



use and has been adopted by the Bell System throughout the country, according to the manufacturer.

Made for the rapid change of numbers, letters, words, etc., from one combination to an entirely different one, the machine will print forms in the proper location quickly, accurately, neatly and economically, the company states. It is equipped with automatic ribbon feed and solid brass deeply engraved wheels. These wheels are engraved to order with required reading matter.

The special slide-in platform and dial sets the depth of print. Merely set the dial, place form on platform and slide into machine which will automatically print in the correct location. This platform moves on ball bearings which will eliminate fatigue and any guesswork, it is said. Request NP 845.

•

DIGGER, LIFTER, TRANSPORTER—Availability of a new multi-purpose piece of equipment designed especially for utility company construction and maintenance work has been announced by Pitman Mfg. Co.

It is the Pitman hydra-lift, Model 60HB, equipped with a hydraulic digger attachment and installed on a Pitman truck body offers, in a single, self-contained unit, a piece of equipment that can lift loads of all kinds, dig a hole, also transport men, tools and materials to and from a job.

Powered by the same hydraulic system that powers the hydra-lift itself, the digger attachment handles augers with diameters up to 24 inches. Pitman can supply augers with flights of varying lengths, also a variety of different boring heads.

With the digger on hydra-lift's swinging boom, the operator can dig a hole at any point within a 180°, 26′ radius of the truck. The operator can also use hydra-lift to set a pole, without removing the auger attachment. Request NP 846.

•

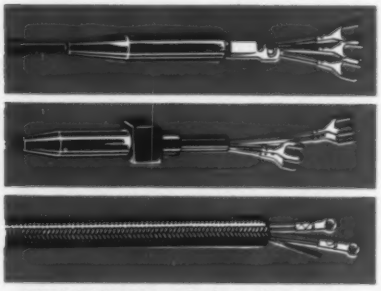
HIGHWAY ADVERTISING SIGNS—Delegates to the recent annual convention of Minnesota Telephone Association were first to view a new highway advertising program geared especially for the Independent telephone companies.

ECONOMY
QUALITY
LONG SERVICE LIFE

ALWAYS
BBUY
COMMERCIAL

It's as simple as that! . . . and Commercial installations are proving this point to hundreds of users year after year. So whenever you order cords—remember, A-B-C and be satisfied!

You name 'em...we make 'em!



- Straight Neoprene-Jacketed Instrument Cords with twisted or parallel inners.
- Neoprene-Jacketed Retractable Cords.
- Nylon Operators' Cords and Switchboard Cords, with or without plugs.
- Neoprene Handset Cords with moulded strain reliefs.

All Commercial Instrument Cords Now Available in Color

Write for Catalog, Samples and Prices.

COMMERCIAL CORD AND SUPPLY CO., INC.
CLIFTON SPRINGS, N. Y.
Phone: HOward 2-5111

QUALITY CORDS FOR ALL MAKES AND TYPES OF TELEPHONE INSTRUMENTS

Unveiled by John Withy & Associates, advertising agency which has worked with the Independent segment of the telephone industry for eight years, the program is built around a large, four-color display which is Scotch-lited for 24-hour visibility. The all-metal displays will be leased to participating

companies on either a three or four-year contract, at monthly rental rates, with full maintenance and upkeep during the life of the contract.

Basic size of the display is 6 feet high by 10 feet wide. A larger board —7 by 12 feet—is also being offered. Each display bears the name of the participating company.

"In creating this program," Mr. Withy explained, "we attempted to 'sell' three things for the telephone companies." He listed them as:

"First and foremost is increased toll business, which studies have proved can be very effectively done through highway advertising.

"Next is added recognition for the Independent industry, through use of the Independent emblem in a prominent location on the display.

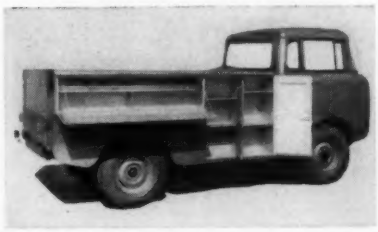
"Third is added recognition for the individual company through use of the company name on each display."

Highway Display, Inc., an outdoor advertising firm doing business in 18 midwestern states, will construct and erect the displays, lease the locations and pay property taxes, maintain the displays on periodic inspection trips, and move the displays if required to do so by highway relocations. This firm services national accounts through Highway Advertising Associates.

Mr. Withy said that monthly rental fees on a four-year basis will be 10 per cent below those for a three-year contract, and additional discounts will be offered for purchases of displays in quantities of six or more. Request NP 847.

JEEP BODIES—Two new model utility Bodies for installing on Willys Jeeps have just been announced by Stahl Metal Products, Inc.

Model WO-84, 84 inches long, installs on the Willys FC-150, and the



WO-107, 107 inches long, installs on the FC-170 Willys. Roomy bulk loading space and interior compartment space provide considerable space for tools and materials used in telephone installation and maintenance operations. The Jeeps provide excellent off-the-highway vehicles for telephone operations, the company states. Request NP-848.

American Creosoting Names Sales Representative

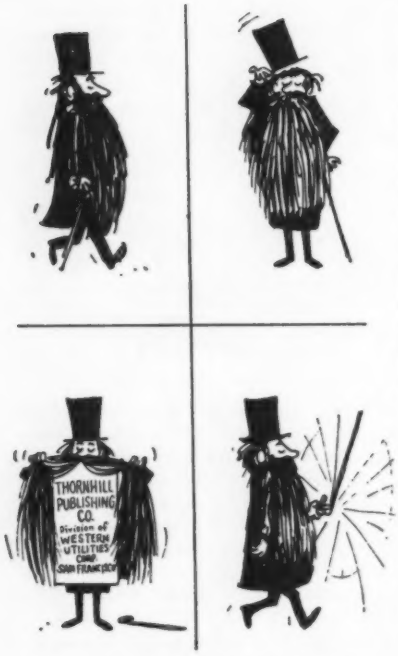
Edward M. Cordon has been appointed sales representative for the

FOR RELIABILITY
FOR SPEED
FOR QUALITY SUPPLIES
FOR PERSONALIZED SERVICE

NOT just because Lindsay provides prompt delivery of nationally known supplies exactly as ordered... but also because of the friendly, personal way we do business, we think you'll like Lindsay. Try us and see!

YOU'LL LIKE LINDSAY

THE LINDSAY TELEPHONE SUPPLY CO., Est. 1939
360 East Highland Rd., Northfield, Ohio
Telephone: IMperial 7-7181



A complete telephone directory publishing service

300 MONTGOMERY ST., SAN FRANCISCO, CALIF.
OFFICES: KILGORE, TEXAS • EVERETT, WASHINGTON
BEAVERTON, OREGON

A POLE THAT
LOOKS LIKE THIS

MIGHT LOOK LIKE THIS
BELOW GROUNDLINE

OSMOSE
INSPECTION & TREATING
Can SAVE this pole for ONLY 7% of its REPLACEMENT COST. Write for 16-page BOOK that will tell you HOW.
WRITE FOR DETAILS
OSMOSE WOOD PRESERVING CO. OF AMERICA, INC.
974 ELLICOTT ST. BUFFALO 9, N. Y.

American Creosoting Corp., a subsidiary of Union Bag-Camp Paper Corp., it was announced on Feb. 28.

Prior to joining the Amcreco organization, Mr. Cordon was a sales representative for the Toledo Scale Co. in Louisville. In his new position his sales activities will be concentrated in Kentucky and Southern Indiana.

Exide Industrial Division Makes Engineering Changes

John R. Smyth, former chief control engineer, has been named to the newly created post of assistant director of engineering at Exide Industrial Division of the Electric Storage Battery Co., Philadelphia.

At the same time, Exide announced that Samuel Eidensohn, former chief of the battery section of the U. S. Navy's Bureau of Ships, will fill the new post of chief project engineer, effective Mar. 3.

Both appointments were part of a series of organizational changes in the division's engineering department, which the company says are designed to accelerate new product development and application.

Mr. Smyth, whose former title has been abolished, continues to supervise all material and process control engineering, as before. In addition, he now has line authority for all battery engineering activities other than submarine and alkaline development.

Mr. Eidensohn is an expert on submarine batteries. He will supervise the company engineering in that field and in the area of alkaline batteries. In 1956 he received the Distinguished Civilian Service Award—the highest honor which the Navy confers upon civilian employes—for developmental work in submarine batteries and in improving submarine operation.

Among other engineering department changes, E. M. Strohlein has been named to the new office of manager of submarine engineering.

W. W. Smith will remain as alkaline battery engineering manager. Mr. Strohlein was formerly application engineer. Both he and Mr. Smith will report to Chief Project Engineer Eidensohn.

Community Responsibility

"No man can postpone his participation in public affairs until he attains top management. Each one of us from the moment we enter business must learn to carry part of the responsibility of business to the community in which it lives."—DONALD K. DAVID, *former dean, Harvard Graduate School of Business Administration.*

Whether a Winch Line Hook or a complete Line Body check ✓ your requirements with

UTILITY TOOL & BODY CO. UT&BCo
CLINTONVILLE, WISCONSIN

Save Money and Time!
TELEPHONE PRINTING SPECIALISTS FOR 49 YEARS
TOLL TICKETS 1L OUT on Bond Paper ONLY 40¢ THOUSAND (MIN. 20,000)
TELEPHONE 42-3341
CULLOM & GHERTNER CO.
PRINTERS • LITHOGRAPHERS
600 21ST AVE., N. • NASHVILLE, TENN.

FOR ALL OF YOUR CENTRAL OFFICE AND PBX INSTALLATIONS, MODIFICATIONS, AND ENLARGEMENTS, IT'S THE
T. E. I.
TELEPHONE ELECTRONICS INSTALLATION CORP.
Hayes Bldg., 12 E. Tenth St., Erie, Pa.
CAN WE BE OF SERVICE TO YOU?

ORDER FROM L. E. S. AND PAY LESS
LINEMEN'S CONSTRUCTION TOOLS
PROMPT DELIVERY FROM STOCK
Send for Bargain Stock List No. LT.
LINE EQUIPMENT SALES
529 So. Dearborn St., Chicago 5, Ill.

EMPIRE
—3-wire & 7-wire Strand
—Stainless & Galvanized Lashing Wire
—Pole Line Hardware
—Specialties for the Communications Industry
EMPIRE STEEL & WIRE CORPORATION
1506 Wesley Ave., Erie, Pa. Phone 86-542

CABLE SPLICERS • LINEMEN
STATION INSTALLERS
STEADY WORK, GOOD PAY
MIDWEST LOCATION.
The Weikel Line Company, Inc.
FORT WAYNE, IND.

CABANISS-POGUE COMPANY
Consulting Engineers
Appraisals—Cost and Rate Studies
Financial Assistance
GRANT BLDG., ATLANTA, GEORGIA

CARL C. CRANE, INC.
Consulting Engineers
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Telephone CEdar 3-4210

ENGINEERING ASSOCIATES, INC.
Consulting Engineers
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ATLANTA, GEORGIA
TELEPHONE: JAckson 3-5925

McGRATH ENGINEERING, INC.
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TOPEKA, KANSAS
Telephone CE 2-2358

SLOAN, COOK & LOWE
CONSULTING ENGINEERS
Appraisals—Original Cost Studies
Plant, Traffic and Commercial Engineering
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By People Who Know the Telephone Business
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SUTTLE EQUIPMENT CORP.
LAWRENCEVILLE ILLINOIS

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•
Western red cedar
Best for durability... poles from
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